ARE VIRTUAL TEAMS MORE JUST? AN INVESTIGATION OF HOW REDUCING SOCIAL CATEGORIZATION CAN INCREASE FEMALE PARTICIPATION IN MALE-DOMINATED TEAMS

A Dissertation

by

MARY CARMEN TRIANA

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSPHY

December 2008

Major Subject: Management

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Approved by:

Chair of Committee,	Bradley Kirkman
Committee Members	Murray Barrick
	Christopher Porter
	Winfred Arthur, Jr.
Head of Department,	Murray Barrick

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ABSTRACT

Are Virtual Teams More Just? An Investigation of How Reducing Social Categorization Can Increase Female Participation in Male-dominated Teams. (December 2008)

Mary Carmen Triana, B.B.A., The University of Texas at Austin;

M.B.A., The University of Arizona

Chair of Advisory Committee: Dr. Bradley Kirkman

Organizations use work teams to solve complex problems in innovative ways. As such, an abundance of diverse ideas, suggestions, and information should help organizations generate quality products and remain competitive. Yet, there is research which shows that women do not participate as much as men in face-to-face team interactions. Women often get fewer speaking turns than men, they speak for shorter lengths of time, and they are interrupted more often than men. As a result, women's ideas may often be overlooked in work settings. This is problematic, because women make up 46 percent of the United States workforce, and not being active participants in meetings could results in underutilization of roughly half of the firm's human capital.

This study investigated whether the order of face-to-face and virtual communication used by virtual teams could be used as one means of increasing inclusion and participation of women in male-dominated teams. Results from 82 teams confirmed that women felt more included in the team when they communicated virtually first and then face-to-face as opposed to face-to-face first and then virtually. Findings supported a four-stage model where the medium of communication influences feelings of inclusion which influences participation (both self-reported and objective). Participation, in turn,

influences perceptions of interpersonal justice, satisfaction with the team, and ratings received from team members. An objective measure of participation and team performance ratings from five independent raters also show that the more equally team members participate and the higher the team's total communication volume, in both total speaking turns and words spoken, the higher the team's ratings and the more creative the team's output was judged to be.

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CHAPTER I

INTRODUCTION

There is great value in soliciting and using ideas from all employees. As companies increasingly hire knowledge workers and move into new markets in order to find new sources of revenue, they must be able to meet the needs of the markets in which they do business. Typically, meeting the needs of the new market or creating a new product requires a free flow of rich ideas which enables the organization to make the best business decision or to create a new market by innovating. More than ever organizations are using work teams to solve complex problems in innovative ways (Cohen & Bailey, 1997; Kozlowski & Bell, 2003), with a majority of organizations using various types of teams both domestically (Devine, Clayton, Philips, Dunford & Melner, 1999; Gordon, 1992) and internationally (Kirkman & Shapiro, 1997). Research on teams has demonstrated that diversity in teams can be especially beneficial for creativity and innovation because diverse individuals provide the team with diverse information, resulting in more creative end products (McLeod, Lobel & Cox, 1996; O'Reilly, Williams & Barsade, 1998; see Milliken & Martins, 1996; van Knippenberg & Schippers, 2007; and Williams & O'Reilly, 1998, for reviews). Diversity is defined as "any mixture of differences and similarities along a given dimension" (Thomas, 1995, p. 246). Teams can vary in diversity on such attributes as age, sex, race/ethnicity,

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The style and format for this dissertation follow that of the *Journal of Applied Psychology.*

education, function, tenure, and experience, among others. Consistent with the "value in diversity" hypothesis (Cox, Lobel & McLeod, 1991), this suggests that an abundance of diverse ideas, suggestions, and information should help organizations generate innovative end products and remain competitive (Pfeffer, 1983).

On the other hand, there is much research on interaction in teams that indicates some employee ideas may often be overlooked in organizational settings (Benokraitis & Feagin, 1995; Cleveland, Stockdale & Murphy, 2000; Dubrovsky, Kiesler & Sethna, 1991; Kimmel, 2000), resulting in underutilization of an organization's human capital. Research has demonstrated that a number of demographic characteristics, including sex, tend to be related to lower participation rates in team discussions. For example, studies have shown that in mixed sex teams, men get more attention and have many more speaking turns (i.e., an opportunity to speak) than women. This finding holds true across many settings, including business organizations (Benokraitis & Feagin, 1995; Bernard, 1972), educational classrooms (Kimmel, 2000; Wood, 1994), and laboratory settings (Hilpert, Kramer & Clark, 1975; Ritter & Yoder, 2004; Swacker, 1975). For example, in a study of male-female dyads, compared to women, men spoke more than 59 percent of the time (Bhappu, Griffith & Northcraft, 1997; Hilpert et al., 1975). Ritter and Yoder (2004) extended these results by showing that even women who scored high on dominance (as measured by the California Psychological Inventory dominance scale) spoke less when they were paired with men who scored low on dominance. In fact, the only time the high dominance women outtalked the low dominance men was when they were asked to discuss a highly feminine task (i.e., planning a wedding). In a laboratory study on mixed-sex teams, women averaged three minutes of speaking whereas men

averaged approximately 13 minutes (Swacker, 1975). In organizational settings, studies have shown that men out-talk women, and women often have difficulty getting an opportunity to speak; when they do get to speak they are interrupted more often than men (Bernard, 1972).

Empirical studies (primarily conducted in North America) have repeatedly demonstrated that men, due to their higher status and privilege in society (Sidanius & Pratto, 1999), dominate team discussions because they display more assertive nonverbal behavior, they speak more often, interrupt others more often, make more commands, and generally have more opportunity to influence others (Hearn & Collinson, 2006; Merrill-Sands, Holvino & Cumming, 2000). This evidence suggests that women have less opportunity to speak their minds and share ideas in team settings.

From an organizational perspective, having certain groups dominate team discussions is problematic for several reasons. First, the finding that women do not participate equally with men in team settings is alarming, especially when one considers that women make up half of the U.S. population and almost half of the workforce. Women comprised 46 percent of the U.S. workforce in 2005 (Catalyst, 2006). This number is expected to be 48 percent in 2010 (Fullerton & Toossi, 2001). If females have trouble participating in team discussions, this means that the ideas and the human capital of half of the labor force are possibly not being utilized to their fullest extent. Second, the people who dominate discussions and decision-making in organizational settings are not necessarily the most intelligent people, the ones with the best ideas, or the ones who best understand the company's customers. "Besides being unfair to individuals, status generalization can deprive the group of good suggestions from low-status people and

permit a group to be misled by bad suggestions from high-status people" (Webster & Hysom, 1998, p. 354). When certain groups dominate discussions, there may be many good ideas which could have resulted in higher quality decisions that do not surface. In the case of sex-diverse teams, this may result in a large loss of ideas for organizations because women are either not being given, or for whatever reason do not take, the opportunity to state their ideas and suggestions. Particularly in the case of decision-making teams, which need to utilize the information and contributions of all team members (Devine, 2002; Kozlowski & Bell, 2003; Sundstrom, McIntyre, Halfhill & Richards, 2000), getting input from all team members is desirable.

Third, allowing higher status groups to dominate discussions continues to marginalize traditionally underrepresented groups, including women. Having the opportunity to present ideas and be heard during team discussions provides individuals with the opportunity to show their competence to others in their organization. When people appear competent to others and are recognized as being individuals who have good ideas and regularly contribute to team meetings, they should naturally look better in front of their peers, have higher visibility to management, and better chances for promotion within the organization. If we think about these implications in terms of workforce demographics, unequal participation of women in teams may be one contributing factor to the glass ceiling, the invisible but strong barrier which results in women not ascending to the top layers of organizational management (Morrison, White & Van Velsor, 1992). Although females hold 51 percent of professional and managerial occupations, only 1.6 percent of the Fortune 500 firms (eight firms) have female CEOs (Catalyst, 2006). Given these statistics, it appears that the glass ceiling is firmly in

place. It therefore behooves us to probe into some of the factors that may be contributing to these barriers. One such factor is the extent to which underrepresented groups, including women, are included in team discussions within organizational settings so that they can demonstrate their abilities and contribute to the team.

Fourth, if certain team members struggle to voice their thoughts and opinions, this may result in feelings of injustice and potentially demoralize these individuals, making them less likely to participate in team processes. Qualitative data from interviews with women working in organizations have echoed these frustrations. For example, one female editor at *The New York Times* described her frustration with the "old boys' network" and said that managerial meetings on the news floor were stressful for her:

> We are drowned out, not listened to, we are dismissed, passed over. It makes me crazy. The men running the *Times* now truly do not believe themselves capable of sexist feelings. They have serious wives. They help with the dishes. But they are still looking for, and are only comfortable with, people in their own image – in other words, other white men. They have a joking camaraderie together that walls us out. (Benokraitis & Feagin, 1995, p. 114)

Due to the similarity-attraction phenomenon (Byrne, 1971), which describes how people tend to like interacting with others who are similar to themselves, white males may enjoy the company of and favor other white males (Byrne, 1971; Turner, 1985) in ways that promote their professional development and make them more likely to excel within the organization. This may lead members of underrepresented groups to feel excluded. This should be of concern for organizations because when individuals feel excluded they are highly likely to feel that they are being treated unjustly. Justice, in turn, is related to a number of important organizational outcomes, including job

satisfaction, organizational commitment, and job performance (Colquitt, Conlon, Wesson, Porter & Ng, 2001). Because of this, organizations can affect their bottom lines by facilitating team processes that encourage the inclusion of all team member ideas and contributions. However, the first step to changing an undesirable situation is to understand how it develops.

It is important to note here that the focus of this investigation is on encouraging equal participation among a team of men and women peers in decision-making teams that must interact to share information and determine the optimal course of action (Devine, 2002; Kozlowski & Bell, 2003; Sundstrom et al., 2000). However, I must acknowledge that there are times when it may not be optimal for every team member to participate equally. Vroom and Yetton's (1973) theory of leadership described instances when it would make more or less sense for leaders to solicit input from followers. In a situation where knowledge is not equally distributed among the team members and there are experts whom the team should defer to, or a decision needs to be made immediately, equal participation does not make sense (Straus, 1996). Additionally, it is helpful to have a dominant person on the team sometimes in order to facilitate team consensus (Hiltz, Johnson & Turoff, 1986). The purpose of this dissertation is not to argue that equal participation is always good. Instead, my argument is that all else being equal, it is an underutilization of human capital to exclude some people (i.e., women) from team discussions on the basis of their sex. In addition, when equal participation from team members is desired and important as is the case in decision-making teams (Devine, 2002; Kozlowski & Bell, 2003; Sundstrom et al., 2000), organizations need to be armed with techniques for soliciting input from the entire team, including its female members.

Work teams represent a collection of individuals who have deliberately come together, complementing each others' knowledge, skills, and abilities, in such a way that the task can be accomplished (Kozlowski & Bell, 2003). This implies that every team member has something to contribute, and they should be able to participate.

Note that although some have used the terms "group" and "team" interchangeably (Kozlowski & Bell, 2003), the word "team" will be used throughout this dissertation. The key distinction between groups and teams is that while groups are simply a collection of individuals who come together to learn or perhaps share ideas, teams are a specific type of group whose members have complementary skills, are task interdependent, mutually accountable, and share goals (Goodman, Ravlin & Schminke, 1987; Kozlowski & Bell, 2003). I concentrate on teams, because failure of women to participate is a more serious issue in team settings, where all input is generally needed and differences are magnified due to high levels of task interdependence.

Consistent with previous calls to investigate the "black box" of organizational demography (Lawrence, 1997, p. 1), this study will examine one way of increasing female participation in male-dominated teams. Consistent with Kanter (1977), I define a male-dominated team as one where men are in the majority (75 percent or more) and women in the minority (25 percent or less). There are many different types of teams, including task forces which come together for a very specific purpose, and ongoing teams where membership may be stable for years. However, regardless of the type of team, all teams need to be able to manage the diversity of their members (van Knippenberg & Schippers, 2007).

Over the last 50 years, there have been numerous research studies which have probed how many different types of diversity (including sex, race, age, functional diversity, educational diversity, tenure diversity, cognitive diversity, and others) affect team processes and team outcomes. The findings have been mixed (Mannix & Neale, 2005; Williams & O'Reilly, 1998). Some studies show that diverse teams outperform homogeneous teams on complex tasks (Amason, 1996; Hoffman, 1959; Hoffman & Maier, 1961), and also generate more innovative and creative solutions to problems (Amason, 1996; Chen, Liu & Tjosvold, 2005; Triandis, Hall & Ewen, 1965). Other studies show that diverse teams tend to have more conflict and less social cohesion, which results in process losses for the team (Amason, 1996; Mannix & Neale, 2005; Miller, Burke & Glick, 1998; Pelled, 1996a).

One explanation that is frequently put forth to explain why diverse teams might perform worse than homogenous teams is rooted in the social categorization theory (Turner, 1985) and similarity-attraction theory (Byrne, 1971). Social categorization refers to grouping people into certain categories based on demographic characteristics such as sex and race. These surface-level characteristics are salient and are initially used by people to categorize others. People desire to perceive members of their own category as superior and engage in stereotyping, distancing, and disparaging treatment of people in other categories. It is also functional for people to perform this mental social categorization of others, because this process allows people to quickly categorize the diverse array of information that they are bombarded with on any given day (Dipboye & Colella, 2005; Heilman, 1995). In other words, categorizing others is a natural part of the perception process, whereby people select and organize the information perceived

through their senses to organize the world around them (George & Jones, 2008). However, this categorization process can also be problematic because it can trigger negative stereotypes associated with members of minority groups.

Similarity-attraction (Byrne, 1971) refers to the idea that people have more in common with and are attracted to others who are similar to them. Because diverse team members may be less attractive to each other initially, and may rely on stereotypes or resort to prescribed social roles in their interactions with one another, teams may not operate at optimal capacity. In other words, team members get together in a face-to-face setting where social categorization takes place, stereotypes are triggered, and team norms are established. Norms are the informal rules that teams adopt to regulate and regularize team members' behavior (Feldman, 1984). Team norms dictate the patterns of interaction the team will have.

However, an interesting research question that has not been sufficiently answered is what if social categorization on surface-level characteristics did not take place at the beginning of team interactions? Because of recent technological advances, including the Internet and high-bandwidth Internet connections, the use of virtual teams is growing considerably. *Virtual teams* have been defined as groups of coworkers that work interdependently using primarily electronic communication technology to accomplish their tasks (Bell & Kozlowski, 2002; Kirkman & Mathieu, 2005). Even among virtual teams, however, there is a degree of virtualness (Griffith & Neale, 2001; Kirkman & Mathieu, 2005) which means that the team will switch back and forth between mediums of communication (i.e., email, phone conferencing, face-to-face meetings, etc.) during its life cycle. One interesting possibility to consider is that virtual teams may be a way for

diverse team members to work together without triggering the social categorization processes brought on by face-to-face contact, which can lead to stereotyping of women.

Initial findings from virtual teams research show that computer-mediated-communication (CMC) may in fact be an equalizer which allows for equal participation of all team members. For example, research on electronic communication has demonstrated that individuals participate the most and feel the least apprehensive about participating in brainstorming tasks when they interact electronically as opposed to face-to-face (Gallupe, Bastianutti & Cooper 1991). Studies have also shown that lower status team members participate more using electronic interaction than face-to-face interaction (Dubrovsky et al., 1991; Straus, 1996), and that it is easier for people to discuss controversial topics (Cooper, Gallupe, Pollard & Cadsby, 1998) and express dissenting opinions (McLeod, Baron, Marti & Yoon, 1997) when the means of communication is electronic rather than face-to-face. Because communication via electronic media allows people to share their thoughts with others with more anonymity than a face-to-face setting, and without interruptions, it presents a communication forum which provides more social equality than face-to-face settings (Bhappu et al., 1997; Siegel, Dubrovsky, Kiesler & McGuire, 1986). As such, the virtual team setting provides fertile ground for diversity researchers to investigate ways of reducing the negative outcomes that result from social categorization and social exclusion of female team members.

Although I refer to "virtual teams" throughout this dissertation, it is important to note that not all electronic communication is equal. According to media richness theory (Daft & Lengel, 1984), communication media can be characterized by their richness, or the information carrying capacity of a communication channel. A medium's ability to

allow more feedback, cues, language variety and personal focus – determine a medium's richness, and, alternately, its leanness. For example, video-conferencing is likely to engender almost as much bias as face-to-face communication because all of the same cues on which people socially categorize others are available. As the degree of virtualness (Griffith & Neale, 2001; Kirkman & Mathieu, 2005) grows (and richness decreases), though, the social cues that are used to categorize others are weakened. Phone conferencing, for instance, would provide fewer cues than video-conferencing because the visual input about the other person's characteristics (race, weight, etc.) is missing. Email would provide even fewer cues, because it is devoid of both visual and auditory cues about the other person. This provides more anonymity for the parties involved. Therefore, different forms of electronic communication will provide varying degrees of social categorization information (Daft & Lengel, 1984).

As global organizations like General Motors, Toyota, and Sony continue to expand their operations globally, diverse employees from the different corporate regions will be utilizing these various forms of electronic communication to complete their work in virtual teams. The use of these global virtual teams is on the rise, and these teams are often assigned to complete very important projects (Maznevski & Chudoba, 2000). As such, it is important for researchers to understand how dynamics among diverse team members unfold within the virtual team context.

This study makes four important contributions to the literature. I first contribute to the virtual teams literature by identifying potential benefits to having diverse teams interact virtually before meeting face-to-face. Researchers studying virtual teams in the field have noted that it is important for the team to have an initial face-to-face meeting at

the beginning of the team's life cycle in order for the team to establish rapport, trust, and get off to a good start (Hambley, O'Neill & Kline, 2007a; Horwitz, Bravington & Silvis, 2006; Lantz, 2001). This is consistent with experimental research which shows that when team members are grouped together cohesion scores are higher in face-to-face groups than in groups communicating virtually (Hambley, O'Neill & Kline, 2007b). However, this research did not take team heterogeneity into account. Studies that have specifically examined heterogeneous teams have often found that diversity in teams can lead to lower cohesion when interacting face-to-face. Williams and O'Reilly's (1998) team diversity review concluded that surface-level diversity, including sex and race diversity, generally leads to poorer team processes and performance. This is consistent with recent experimental research examining heterogeneous teams which found that virtual heterogeneous teams outperformed face-to-face heterogeneous teams (Staples & Zhao, 2006). Therefore, it seems premature to conclude that virtual teams should always meet face-to-face first. In fact, if the team is heterogeneous and the initial face-to-face meeting triggers social categorization and stereotyping of minority team members, this may be exactly the wrong thing to do from a diversity perspective. It may be preferable to let the team interact virtually and establish norms of equality and equal participation first, before having them meet face-to-face. Establishing norms within a virtual environment before meeting face-to-face may allow virtual teams to reap the benefits of subsequent face-to-face interactions without the problems associated with social categorization and stereotyping during first impressions.

The second contribution is that this study will make is to explore one possible path to promote equal participation among male and female team members.

Specifically, I will explore the degree to which virtual interaction can be utilized by teams to reduce social categorization and establish norms of equal participation in sex diverse teams. Other studies of CMC have already demonstrated that electronic communication can equalize the level of participation among team members (Siegel et al., 1986). However, the problem with these findings is that they suggest the benefits of virtual communication will hold as long as team members never see each other and the face-to-face social categorization process is not triggered. In organizations, this is impractical because very few teams are completely virtual. In reality, there is a degree of non-virtualness even within most virtual teams (Griffith & Neale, 2001; Kirkman & Mathieu, 2005; Martins, Gilson & Maynard, 2004), which means that eventually the team will meet face-to-face, triggering social categorization.

Within this study, I seek to investigate whether the norm of equal participation, which has been demonstrated in initial virtual interactions, will hold in subsequent face-to-face communication. Because we know from previous research that team norms are formed very quickly and that norms are enduring (Bettenhausen & Murnighan, 1985, 1991; Feldman, 1984; Hackman, 1987), this study will explore whether initially establishing norms of equal participation and social equality within a virtual team setting could possibly lead to more egalitarian participation in subsequent face-to-face communication. This extends previous literature on CMC because it explores whether the egalitarian interaction developed using virtual interaction will carry forward to other settings that do provide the surface-level characteristics which allow for social categorization. It is important for researchers to explore ways of establishing social

equality and reducing stereotypes stemming from social categorization, because doing so can help identify techniques to reduce discrimination within organizations.

The third contribution of the study is that it will inform research regarding team processes. This study will advance our understanding of team processes in two ways. For one, the study will test whether the theories of Feldman (1984) and Bettenhausen and Murnighan (1985) are supported when the team context changes from virtual interaction to face-to-face interaction. These researchers maintain that team norms are established very quickly and are enduring. For example, Feldman (1984) argued that norms have a powerful and consistent effect on team member behavior and that norms are enforced because they facilitate team survival or make team behavior predictable. Bettenhausen and Murnighan (1985, p. 352) referred to norms as powerful forms of social control and provided evidence that newly formed teams' "behaviors are most strongly determined by the norms that developed when they *least* knew what they should be doing." In other words, both of these theories of team norms are unanimous in stating that norms develop very early during team interaction and are powerful determinants of behavior. The present study will allow us to see if norms regarding patterns of communication will endure when the medium of communication changes from virtual team interaction to face-to-face team interaction. Such changes in communication media are often required for virtual teams, because virtual teams switch back and forth between virtual and face-to-face communication during their life cycle to get their work done (Kirkman & Mathieu, 2005).

Two, team processes will be explored within a more recently developed team process framework. Team studies have traditionally relied on the classic input—

process—output (IPO) model (Hackman, 1987; McGrath, 1984; Steiner, 1972). The IPO model was originally conceptualized by McGrath (1984) as a framework for understanding team behavior. The inputs in the model can be individual-level (such as team member skills or personality), team-level (such as team size), or environmental-level (such as task characteristics or the organizational reward structure). These inputs are then presumed to influence the team processes, which are the actual interactions that take place between team members as the work gets done (Marks, Mathieu & Zaccaro, 2001). The processes, in turn, influence the team outputs. These outputs can be classified as performance-based (e.g., quality or quantity of outputs produced), behavior-based (e.g., turnover, absenteeism), or as affective outcomes (e.g., team member satisfaction, commitment; Cohen & Bailey, 1997). More recently, however, authors have begun to question whether there may be some other intervening variables that need to be considered (Ilgen, Hollenbeck, Johnson & Jundt, 2005; Marks, Mathieu & Zaccaro, 2001). For example, Marks, Mathieu and Zaccaro (2001) proposed that teams researchers have defined team processes too broadly. They maintain that the way we traditionally think about team processes needs to be updated to include two categories, processes and emergent states. Processes represent the actual techniques and mechanisms that teams use in order to get their work done and emergent states represent changing states of being among team members which can include things like team cohesion and identification (Marks, Mathieu & Zaccaro, 2001). This enhanced model of team processes fits nicely within the context of diversity in teams, because it is not necessarily logical to assume that there is a direct relationship between team diversity and team processes. Surface-level differences between team members may not

automatically lead to process problems among team members. Instead, it seems more likely that intervening variables such as inclusion/exclusion of team members (considered an emergent state within this study) will in fact be an intervening variable which triggers process problems such as a lack of coordination or participation. Therefore, this study will also further our understanding of team processes by testing an updated version of the classic IPO model, including emergent states, within a diverse team context.

Finally, the last contribution this study will make is a theoretical contribution to the literatures on social categorization and similarity-attraction. Although both of these theories have helped us understand workplace diversity immensely, these theories both present a somewhat pessimistic view of diversity management in organizations. They imply that minority team members who are different will have a harder time fitting into the work organization and excelling in the organization because it is human nature to categorize others (Turner, 1985) and to be attracted to others who are similar to themselves (Byrne, 1971). Clearly, these ideas have their merit when one considers the persistence of phenomena such as the glass ceiling which demonstrate how few women reach the top levels of organizations (Catalyst, 2006).

However, this presents a somewhat hopeless situation for members of the minority group, because it implies that they will never be accepted equally to members of the majority group. The reason the present study makes an important theoretical advancement to these two theories is because it provides an alternative to this problem. This study explores a team setting in which the effects of social categorization and similarity-attraction may be seriously weakened. While social categorization and

similarity-attraction theories suggest that women and minorities may never achieve true acceptance from many members of majority groups, the current study implies that this does not necessarily have to be so. Given the technology available to conduct business today, team members can interact and get to know one another through virtual team communication before they ever meet face-to-face. Theoretically, this means that it is possible to remove the negative effects of surface-level social categorization and similarity attraction which can operate against members of minority groups. Therefore, this study seeks to create an environment where the emphasis on social categorization is reduced and there is more equality for minority group members.

In doing so, this study contributes to our understanding of the more "optimistic" view of diversity (Mannix & Neale, 2005, p. 33). This optimistic approach to studying diversity in teams grounded in the "value in diversity" hypothesis (Cox, Lobel & McLeod, 1991) which argues that in spite of some challenges that diversity might create in the team interaction process, diversity ultimately benefits teams because individuals with diverse backgrounds have access to a broader range of information, knowledge, and expertise than a homogenous team would (Hoffman 1959; Hoffman & Maier, 1961; Mannix & Neale, 2005). This is consistent with the information/decision making perspective of team diversity (Williams & O'Reilly, 1998), which argues that diverse individuals have greater access to diverse information because of their varying social networks outside of their workgroups. If this information can be effectively funneled back into the team during team decision-making, the richness of the information should enhance the quality of the work that the team produces (Ancona & Caldwell, 1992; Jehn, Northcraft & Neale, 1999; Zenger & Lawrence, 1989). By investigating the way that

sex-diverse teams interact within virtual and face-to-face team settings, this study provides insight on how to obtain the benefits of the informational perspective of team diversity by demonstrating how communication media can be used to achieve effective interaction among diverse team members.

CHAPTER II

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

To understand the nature of sex diversity in team settings, it is essential to understand both sex roles and team process. In the following sections, I will first describe the nature of sex inequality and how this may contribute to the exclusion of women in team settings, particularly in male-dominated settings. Second, I will explain how having the ability to socially categorize one's team members on the basis of surface-level characteristics (i.e., sex, race) can trigger the similarity-attraction biases (Byrne, 1971), which can also cause women to feel excluded or isolated from male dominated teams. Third, I will describe the role of norms in teams and explore virtual communication as a possible means of establishing norms in a setting that avoids the stereotypes associated with social categorization. Finally, I will explore the relationship between team member participation and team outcomes including justice perceptions, satisfaction with the team, team member ratings of one another, and team performance. The theoretical model I will investigate in this paper is illustrated in Figure 1.

Sex Diversity

Sex differences have long been the subject of investigation in the fields of psychology, sociology, and management. In a 40-year review of the team diversity literature, Williams and O'Reilly (1998) concluded that sex diversity generally has a

negative effect on teams. The purpose of this section is to investigate potential underlying causes of these effects.

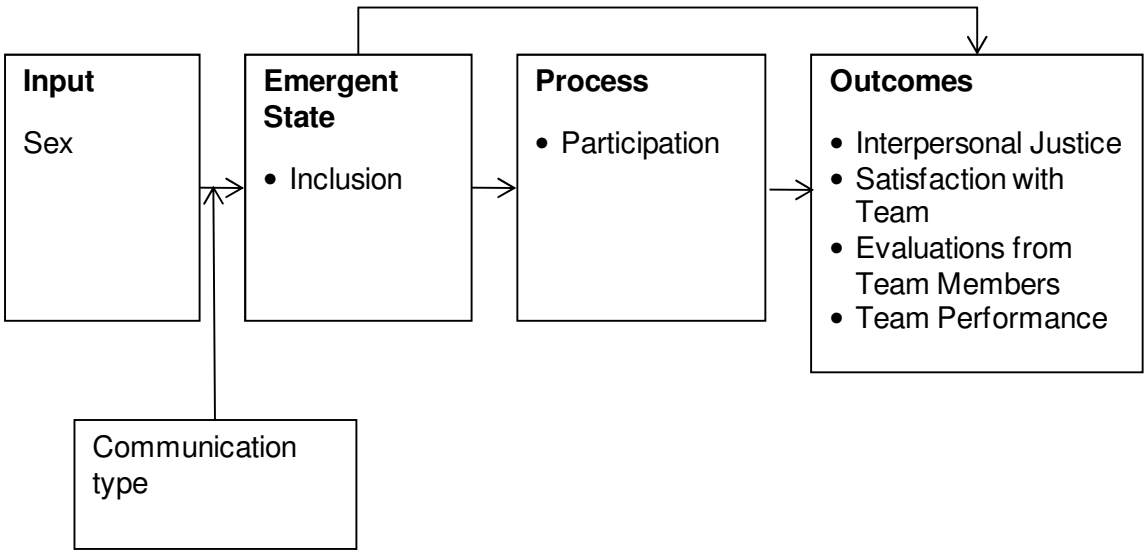


Figure 1. Theoretical model.

Anecdotal evidence tells us that there are differences between males and females which can sometimes lead to problems. The term "battle of the sexes" is so common that a search on google.com produced 1.25 million results (i.e., "hits"). The book *Men are from Mars, Women are from Venus*, which discusses differences between the sexes that can cause communication problems, was a #1 *New York Times* bestseller. Even Elvis Presley sang a tune describing conflict between men and women as "the cause of trouble ever since the world began." The song, *Hard Headed Woman*, was so famous that it became the first rock and roll song to be awarded the "gold record" designation by the Recording Industry Association of America. Clearly, people understand that there are differences between men and women which can be problematic.

Researchers have also noted differences between men and women, including the status that they are afforded in society. Sidanius and Pratto (1999) state that in every society males are the dominant sex. In a survey of over 11,000 people from all over the world, these researchers found that people always ranked males above females in terms of their social status. Put simply, males dominate (Sidanius & Pratto, 1999). How does this happen?

Previous Research on Sex Diversity in Groups

Research investigating diversity in teams is typically grounded in theories that explain how people mentally categorize themselves and others, with what groups people identify, and to whom they tend to be attracted.

Social Categories

Social categorization theory, social identity theory, and similarity-attraction theory all suggest that sex diversity should have negative effects on team processes. The presence of others who are different from oneself may lead to a social categorization process which creates an in-group and an out-group (Kramer, 1991), resulting in "us" versus "them" feelings. It is important to make a note here regarding the way that the social categorization and social identity theories are being used in this paper. The social categorization and social identity theories were originally conceived of as applying to inter-group relations (Tajfel, 1978; Tajfel & Turner, 1986), not intra-group relations. However, over time these theories have been applied to explain intra-group phenomena because individuals are thought to have a hierarchy of self categorizations which exist at

the individual, group, and superordinate levels (Alderfer & Sims, 2003; Mannix & Neale, 2005). Following this precedent, I apply social categorization and social identity theories to intra-group behavior because individual self concepts are triggered based on the other members within a social group (Markus & Cross, 1990).

Similarity attraction theory predicts that at the individual level people are more attracted to others who are similar to themselves (Byrne, 1971). Self categorization and social identity theories provide mechanisms to understand the similarity-attraction phenomenon at the group level. Self categorization (Turner, 1985) describes the way that people define their self image in terms of their membership in social groups. One way in which people can mentally categorize themselves is according to their sex.

Social identity theory (Hogg & Abrams, 1988; Tajfel, 1981) provides a cognitive perspective on the origins of group identification. Identification with a group means that membership in the group is significant to an individual's self-concept, and the interests of the group are of concern to the individual above and beyond their own personal self-interest (Brewer, 1991; 1994). People often use their social identity within certain social groups in order to bolster their personal self image (Tajfel & Turner, 1986). Because people generally want to have a positive self image, they are more likely to associate positive things with their own in-group members and negative things with out-group members. Furthermore, because demographic characteristics such as sex and race are readily observable, these characteristics are often used to quickly categorize others within a social setting (Clement & Schiereck, 1973; Nelson & Klutas, 2000). The problem with social categorization is that it can lead people to stereotype others.

At this point, it is important for me to define how the term "social categorization" will be used within the rest of the paper. Within this study, social categorization is operationalized as the amount of face-to-face interaction with team members. Henceforth within this paper, high social categorization means that teams interact face-to-face. Low social categorization means that teams interact anonymously using CMC. In other words, I make the assumption that exposing teams to more face-to-face communication will make social categorization more salient. The precedent for this technique has been established in CMC research which has manipulated the salience of social categorization and surface-level characteristics of team members by varying the amount of face-to-face and virtual interaction that teams are exposed to (Bhappu, Griffith & Northcraft, 1997; Dubrovsky, Kiesler & Sethna, 1991; Siegel et al., 1986; Weisband & Atwater, 1999).

Stereotypes

People form stereotypes about groups of people in much the same way that they generalize about any aspect of their environment (Heilman, 1995). Categorizing people into groups is functional, because it helps us make sense of the world. However, in the case of stereotypes about sex, social categorization may trigger male and female behavior that is not conducive to equal participation in teams. Stereotypes about male and female behavior generally involve males playing a very active role, while females play a more subdued and supportive role. For example, adjectives used to describe women are generally along the lines of nurturing, tender, understanding, concerned for others, kind, helpful and sympathetic. The adjectives used to describe men are generally

along the lines of independent, decisive, ambitious, forceful, and aggressive (Heilman, 1995; 2001).

There is substantial evidence that differences between males and females, likely exacerbated by social categorization and sex stereotypes, affect the way that men and women interact in teams. Empirical studies have shown that mixed-sex teams report more conflict, more interpersonal tension, and less friendly behavior compared to all-male teams (Alagna, Reddy & Collins, 1982) [see Devine et al., 1999, for additional findings]. Other studies investigating sex diversity in teams have also reported process losses (Clement & Schiereck, 1973; Pelled, 1996b). For example, Pelled (1996b) found that sex dissimilarity among team members increased perceptions of emotional conflict and led to reduced perceptions of team performance.

Proportions Matter

In the process of investigating sex diversity and its effect on team process, one finding that is fairly consistent is that the proportion of men and women in the team seems to be important (Williams & O'Reilly, 1998). These findings are consistent with the classic work of Kanter (1977) that predicted that when women make up less than 15 percent of the group, they will often be seen as tokens and will be stereotyped and marginalized. Particularly when women are "solo", or the only one of their kind in the group, they become especially salient. It is not until the minority group comprises 35 percent or more of the total group that the minority group will have influence in the larger group's decision-making. Some support for Kanter's theory came from Sackett, DuBois and Noe (1991) who found that when the proportion of women in a group was

small, they received lower performance ratings after the effects of ability, education, and experience were controlled.

Although Kanter's theory has received mixed support overall (Mannix & Neale, 2005), there is evidence that females do tend to feel more included in the team as their numbers increase. This is consistent with research showing that as a particular minority group becomes increasingly small in proportion to the total group, those who are part of that minority group will become increasingly aware of their identity (Ethier & Deaux, 1994; Mullen, 1983). This is also consistent with findings that show that women in predominately male organizations have been treated with hostility by male coworkers (O'Farrell & Harlan, 1982), that women in male-dominated teams are not well integrated (Brass, 1985; Ibarra, 1992; Kanter, 1977), and that sexist stereotyping is more common in male-dominated teams than in female-dominated teams (Konrad, Winter & Gutek, 1992).

Interestingly, however, men in predominantly female groups seem to be better integrated socially and treated in a more egalitarian manner (Fairhurst & Snavely, 1983). In addition, while solo women in male-dominated groups speak the least of all the team members, solo men in female-dominated groups speak the most (Myaskovsky, Unikel & Dew, 2005). Overall, these findings are consistent with sociological research which suggests that from socialization as children, females are taught to interact in a way that is inclusive of others while males are taught to interact in a way that is more competitive (Wood, 1994).

For example, some researchers have observed that men and women exhibit different speech patterns (Tannen, 1990). Women's speech tends to be characterized by

equality between people (Aries, 1987), supporting others, sustaining conversations by prompting others to speak, and responsiveness via showing concern for others and making them feel included and valued. Women's speech also tends to be more tentative than that of men, including words like "kind of", "probably", or ending in a question such as "don't you think?" which then invites others to be included in the conversation (Kemper, 1984; Lakoff, 1975; Wood, 1994, p. 143). Men's speech, on the other hand, tends to focus more on exhibiting knowledge or ability, accomplishing instrumental objectives, controlling the conversation by challenging other speakers or taking the stage away from them, and expressing themselves in ways that are more absolute, direct, and confident (Wood, 1994). These learned patterns of speech and behavior could then potentially create a challenge for women within the university and organizational settings as they try to compete with men for top grades, advanced degrees, and promotions in male-dominated settings.

"Ice Queens" and "Iron Maidens"

If women are being excluded from male-dominated teams because their more subdued speech patterns and behavior do not allow them to break into male conversations, then one obvious solution would be for women to be more assertive and to force their way into the conversation. However, research generally shows that this is a bad idea for women because women are often penalized for acting outside of their prescribed sex stereotypes. Because stereotypes about female behavior maintain that females should be kind, gentle, considerate, and not aggressive, people may automatically expect females to behave in a more submissive and passive manner than

males (Cleveland et al., 2000; Heilman, 1995). These stereotypes then put pressure on women to behave in accordance with their prescribed sex roles. For example, research has demonstrated that women who act outside of their prescribed sex roles by exhibiting masculine traits such as confidence in their abilities and assertiveness are often thought to be cold individuals, or "ice queens," and are interpersonally derogated (Heilman, 1995; Heilman, Wallen, Fuchs & Tamkins, 2004). This is consistent with Kanter's (1977) theory which stated that assertive women in the corporate environment would be categorized as "iron maidens." This is also consistent with evidence from the popular press. For example, during the Enron trial, it became known that Sharon Watkins, the high-ranking female who blew the whistle on Enron's business practices was commonly referred to as "the buzzsaw" by her male peers (Flood, 2006).

Inclusion and participation for women in male-dominated teams, then, is not easy. On the one hand, women are socialized to be supportive and somewhat passive members of society which makes it difficult for them to take very active roles within male-dominated teams. On the other hand, if they do act assertively in their interactions, their behavior is often seen as inappropriate and they may be ridiculed, nicknamed, or treated as tokens. In many cases, it is simply easier for women to recede from team discussions than it is to assert themselves and face social or professional rejection (Benokraitis & Feagin, 1995).

Diversity Training

Many organizations invest in diversity training as a means of promoting harmony and inclusive behavior among a diverse workforce (Rynes & Rosen, 1995). There are

different diversity training techniques including cultural simulation games, like Bafá Bafá, which create unique cultures as part of the simulation (Shirts, 1977) and interactive training sessions where people are exposed to members of other groups (Triandis, Kurowski & Gelfand, 1994). The interactive training sessions often take the form of experiential training (where the goal is for members of different groups to interact and have good experiences), or exposure to the strengths of other groups (where each group learns to appreciate the strengths of the other group; Triandis, Kurowski & Gelfand, 1994).

Although diversity training sounds very good in theory, its results have been mixed (Briggs, 2002). Diversity training seems to be most effective when the top level managers in the organization make diversity initiatives a top priority (Rynes & Rosen, 1995). When this is not the case, however, diversity training efforts are much less effective. In fact, the majority of human resources practitioners surveyed by Rynes and Rosen (1995) said their training efforts either had mixed results or were ineffective. Two other empirical studies assessing diversity training effectiveness have also found no significant effects from diversity training (Neville & Furlong, 1994; Pruegger & Rogers, 1994). In addition, several other researchers have noted that in the worst case, diversity training may actually produce backlash from males, reinforcement of negative stereotypes, or even intensify hostility between groups (Beaver, 1995; Galen & Palmer, 1994; MacDonald, 1993; Mobley & Payne, 1992; Murray, 1993).

Another issue with diversity training involves the complexity of knowing who to train and what to train them about. For example, while men (as the stereotypically dominant sex) would seem like the natural targets for sex diversity training, there is

evidence to suggest that females perpetrate just as much bad behavior towards each other. Researchers have shown that women often see each other as competitors and become envious of each other (Eichenbaum & Orbach, 1987), and that women in positions of power sometimes abuse their female employees (Rollins, 1985). Particularly if women ascribe to sexist beliefs themselves (Glicke & Fiske, 1996) or are high in social dominance orientation (the idea that the social hierarchy of males in a position of power over females is correct; Sidanius & Pratto, 1999), women may treat other women very badly. Researchers have coined names to describe the bad behavior that women sometimes inflict on other women. One is often referred to as the "queen bee syndrome" and refers to women who have achieved success within the social structure and then endorse traditional sex roles and deny that there is discrimination against women (Abramson, 1975, p. 55; Staines, Travis & Jayerante, 1973). Consequently, these women show no sympathy or support towards other working women, especially their subordinates, and women do not like to work for these females (Gini, 2001). Therefore, although there is evidence that women feel more optimistic and better supported in organizations where there are a large proportion of female leaders (Ely, 1994), this situation is very different when the female leaders are tokens. When female leaders are isolated within a male-dominated team, they are more likely to behave in ways which help them fit in with their males peers while simultaneously isolating themselves from other female subordinates (Nieva & Gutek, 1981).

Overall, although diversity training sounds very good in theory, it may be very difficult to implement it well in practice. Organizations have had mixed results using diversity training, it can create a backlash from males who feel they are being targeted,

and it can sometimes reinforce negative stereotypes. In addition, there is evidence to suggest that targeting training at men may be inappropriate because some women need sex diversity training just as much as men do. Because of all the complexities associated with sex roles and because of the limited success of many diversity training efforts, I believe there is great value in studying work settings that change the way that men and women in work teams interact.

Changing the Way That Men and Women Interact in Teams

Social categorization and sex stereotypes are pervasive (Heilman, 1995). When sex diverse teams come together and interact in face-to-face settings, it seems almost inevitable that men and women will perform a mental exercise which socially categorizes team members and leads to behavior consistent with sex roles. This then sets the norm for team interactions. One way to possibly enhance the participation of women within teams and enhance women's visibility within organizations, then, may be to change the environment in which team norms form. If norms could form in an environment that was free from surface-level social categorization, this could ensure that the organization creates an environment conducive to women's participation in the teams of which they are a part.

To summarize, research has shown that due to sex stereotypes and socialization, women in male-dominated teams face obstacles and do not participate at the same rate as men. Researchers have noted this is not only unfair, but it can lead to the invisibility of women, the devaluation of their contributions, and contribute to the glass ceiling (Cleveland et al., 2000; Heilman, 1995; Wood, 1994). This has been well established.

However, what we know less about is what can be done to increase the participation of women in male-dominated teams without creating a backlash from men.

It is important to keep in mind that sex stereotypes can only have these negative effects when sex is salient. In this regard, *virtual interaction* (i.e., electronic communication through email or chat programs) can help to remove social categorization and the accompanying sex stereotypes. If individuals do not know the sex of the other members on their team, then they have no basis upon which to expect them to behave according to their sex stereotype. Even if team members do know the sex of their teammates, the lack of face-to-face interaction means that biases based on sex will be less likely to be triggered. Evidence for such a phenomena was presented by Dubrovsky, Kiesler and Sethna (1991) who found that even when team members were identified by name, both high and low status participants in their experimental design were equally likely to participate in a team discussion when communication was virtual; however, lower status team members participated less when the communication was face-to-face. Apparently, virtual communication provides a mechanism for lower status team members to enter into a discussion with higher status individuals, even if they identify themselves. This means that instead of strongly associating people with just surface-level characteristics, team members in virtual settings should be able to get to know each other based on the knowledge they bring to the team. Even if team members still conduct a mental categorization process in virtual teams, it is likely to be based on some meaningful characteristic (i.e., contributions) as opposed to surface-level characteristics that are irrelevant to the task at hand. Virtual communication, then, could lead to team norms of equal participation where everyone can contribute ideas equally,

regardless of sex. This should then lead to greater feelings of inclusion and participation rates for females in teams where the majority is male. In the next section I will explore the process by which team norms develop and whether initially establishing norms of equal participation and social equality within a virtual setting could possibly lead to more egalitarian participation in sex diverse teams.

Overview of Team Processes and Norms

Tuckman (1965) presented a model depicting the stages of team process whereby teams go through a cycle of four stages: forming, storming, norming, and performing. In the forming stage the team is assembled. In the storming stage, conflict may emerge as team members try to figure out the patterns that they will use to interact and who the dominant team members will be. In the norming stage, team conflicts are usually resolved in one way or another as a leader emerges and the team gets into a routine of interacting with one another. Finally, once these norms are set for the team, the team then moves into the performing stage where they work according to those norms of interaction.

Although Tuckman's classic theory of team stages is elegant and simple, more recent models of team development have demonstrated that it does not always match what happens in teams. For example, Connie Gersick contributed to our understanding of how team processes unfold over time. Gersick (1988) was studying time and transition in work teams in the field, and she noticed that the teams were not following Tuckman's simple model. Instead, they would work for a period of time, and then, around the midpoint of their time together they would make changes to the way they were doing

things. Then they would settle back into a routine and get more work done. Gersick (1989) conducted a more controlled laboratory study to analyze this transition process in teams. She found the same shift at the midpoint and explained that this was a *punctuated equilibrium*, whereby teams would show a pattern of radical change around the midpoint when they realized they had used up half of their time.

More recently, researchers have explained that team processes are really a combination of Tuckman's classic model as well as Gersick's punctuated equilibrium model. For example, Morgan, Salas, and Glickman (1993) incorporated a period of re-forming in the middle of a model resembling Tuckman's original stages model to represent the integration of Gersick's midpoint shift. Chang, Bordia, and Duck (2003) also conducted an empirical examination and found that Gersick's punctuated equilibrium and Tuckman's stages models can be complementary. The authors found evidence that team work can be a linear progression, a punctuated equilibrium, or a combination of the two.

Regardless of the changes that have been made to the models of team process over the years, one component that always stays the same is the importance of team norms. Team norms are the informal rules that teams use to regulate team member behavior (Feldman, 1984). All models are in agreement that norms are central to team process and govern team behavior. For example, Tuckman (1965) and Morgan, Salas, and Glickman (1993) both have a stage they refer to as "norming." Chang, Bordia, and Duck (2003, p. 107) state that the work can begin "once goals, structures, and norms are established." Gersick (1989, p. 277) also observed that "groups established perceptual and behavioral patterns suddenly and worked within those patterns for relatively long

periods." Therefore, regardless of how the team process model is conceptualized over the years, the formation of norms is central to all of the models.

The Development of Team Norms

Although norms are typically not explicitly documented or openly discussed, they often have a powerful and consistent influence on team member behavior (Hackman & Oldham, 1976). In his classic article on team norms, Feldman (1984) describes four ways in which team norms develop. First, explicit statements by supervisors or coworkers may cause team norms to develop. Such norms may include directives that facilitate team survival or task success that are created by leaders within the team (Whyte, 1955). Second, team norms may develop due to critical events in the team's history. This can include an event that caused changes in the team's behavior in order for the team to survive, or conscious decisions by the team acknowledging the need for change after a particularly bad experience. Third, primacy, which refers to the first behavior pattern that emerges in a team, can set the team expectations for future interaction. Because the first patterns of interaction set expectations and simplify future interactions, these initial interactions tend to endure within the team. This can help make future interactions predictable and simplify decision-making so that team members do not have to decide how to behave every time they convene. This primacy effect is particularly relevant in this study, because one goal is to test whether or not a norm of equal participation which develops in a virtual setting can carry over to a subsequent face-to-face setting. Fourth, team norms may carry over from behavior in past situations. Team norms in organizations may emerge because the team members bring

with them expectations from other teams. Bringing these experiences forward from other team situations can simplify team interactions because then the members do not have to relearn their roles. Feldman specifically mentions this fourth method using examples of occupations and roles that are well defined and consistent in terms of the types of behavior that would be expected across multiple settings (for example, lawyers, doctors, and professors and students in classrooms can apply the same scripts, or patterns of behavior, in different settings).

Overall, research on team norms is consistent in that norms are regular patterns of behavior that are uniform within a particular team (Bettenhausen & Murnighan, 1985, 1991; Feldman, 1984). Research has also demonstrated that norms develop early within the team's interaction, "often before a group's members adequately understand their task" (Bettenhausen & Murnighan, 1985, 1991). So long as the team is behaving in a functional manner, team norms typically persist. If major problems or challenges arise within the team, then norms may be consciously altered by the team in order to improve team functioning (Bettenhausen & Murnighan, 1985, 1991; Feldman, 1984). However, once the major challenge has been resolved by the team, more attempts to change the norms will be met with sanctions (Bettenhausen & Murnighan, 1985, 1991). As norms develop and begin to govern team behavior, it is important to understand the affective reactions that the individual team members will have as the team interaction progresses. I now turn to a discussion of *emergent states*, a construct which describes how team member affective reactions to the team environment influence subsequent team processes.

Emergent States

Classic works on team process have generally defined the nature of team performance in a way that team inputs lead to team processes and team processes lead to team outputs (an IPO model) (Hackman, 1987; McGrath, 1984; Steiner, 1972). More recently, however, this IPO framework has been criticized for not being complex enough to accurately represent teams (Moreland, 1996). There have also been other theoretical advances in the team literature (Ilgen et al., 2005). For example, the concept of emergent states was introduced by Marks, Mathieu, and Zaccaro (2001). They defined emergent states as constructs that "characterize properties of the team that are typically emergent in nature and vary as a function of team context, inputs, processes, and outcomes" (Marks, Mathieu & Zaccaro, 2001, p. 357). These emergent states are cognitive, motivational, and affective states as opposed to processes, because they do not specifically describe the nature of the interaction between team members. For example, Marks, Mathieu, and Zaccaro (2001) defined affect as a state instead of a trait because it possesses malleable qualities that can change over time. For the purposes of this paper, emergent states are considered to be affective states which reflect the way team members feel about their teams. This includes inclusion. Team processes, on the other hand, are considered to be outcomes of emergent states which reflect the actual participation of team members as they work to accomplish the team task.

The theoretical justification for having inclusion as an emergent state within the model (over other theoretically plausible alternatives) is threefold. First, social categorization (Turner, 1985) and similarity-attraction (Byrne, 1971) theories both

predict that people are attracted to similar others, are more likely to identify with them, and consequently more likely to include them in their in-group. This suggests that inclusion is affective in nature and may be important to subsequent team processes. Second, qualitative accounts that shed light on how women come to feel isolated from male-dominated teams allude to feelings of exclusion in the team. For example, one college woman described her feelings of exclusion, and ultimately, withdrawal from class participation:

> I don't speak in class anymore. All this professor ever talked about was men, what they do, what they say, always just what's important to men. He, he, he is all I ever heard in class. He wasn't speaking my language. And whenever I tried to speak about what was important to me, whenever I tried to ask questions about how women fit into his scheme all I got was a negative response. I always felt I was speaking from inside brackets, like walls I couldn't be heard past. I got tired of not being heard so I stopped speaking altogether. (Lewis, 1990)

Women in professional settings also describe similar feelings of isolation. One female vice president of a university described:

> I've attended several dean's conferences where about six out of the 70 participants are women. Women are usually ignored—during panels and informational discussions—because men think they have nothing to learn from women. (Benokraitis & Feagin, 1995, p. 112)

These social accounts describe the frustrations that women feel in social situations when they feel they are being ignored or excluded. Notice that in both of these situations, females described that their sex was salient and they were in situations where they felt that males were dominating the discussion and not letting them in. Each time, they described being excluded by the men. As such, inclusion appears to be a critical construct in understanding why females do not participate more in male-dominated teams.

Third, feelings of inclusion have the potential to change. One day you may feel included in a team because people are talking to you and including you in activities. On a different day you may feel less included if nobody talks to you or asks you for your input. Similarly, feelings of inclusion with the team can also change. For example, let us assume that there are few Latin American soccer fans in an office full of American football fans. On days when the team's discussion focuses on a neutral topic of common interest, all members of the team could really enjoy interacting with one another and see themselves as very similar to other team members. However, on days when the conversation is about football, the soccer fans may not feel like they really have much in common with the other members of the team. In other words, inclusion is not constant. It is a state which makes it consistent with the definition of emergent states. In the next few paragraphs, I examine this emergent state more closely and present hypotheses about how it relates to the other constructs in the model.

Inclusion

As a construct, inclusion has been described as "the degree to which individuals feel part of critical organizational processes" (Mor-Barak & Cherin, 1998, p. 47). This means that people have access to information and resources, are involved in their work team and can influence decision-making (Holvino, Ferdman & Merrill-Sands, 2004). Inclusive organizations have been defined as those where "the diversity of knowledge and perspectives that members of different groups bring to the organization has shaped its strategy, its work, its management and operating systems, and its core values and norms for success" (Holvino, Ferdman & Merrill-Sands, 2004, p. 249).

Previous research has shown that the social categorization process can lead people to feel excluded when they realize how different they are from other members of the team, or conversely, when team members see them as different and treat them like they are different. It is this social categorization process which can trigger a sequence of events and behaviors that can affect team processes (van Knippenberg, De Dreu & Homan, 2004). In the presence of social categorization processes which make differences obvious to people, minority team members can feel isolated and ignored (Benokraitis & Feagin, 1995). For these reasons, in the absence of social categorization it is much less likely for minority team members, like women in male-dominated teams, to feel excluded. To the contrary, the absence of social categorization obfuscates sex differences and will make females feel as much a part of the team as anyone else.

This reasoning is consistent with social presence theory (Short, Williams & Christie, 1976), which describes that the extent to which people feel socially present in a communication is a function of subjective evaluations of the richness of the communication medium. Social presence is higher in face-to-face settings which provide verbal and nonverbal cues than it is in other settings which remove one's ability to see or hear the other person. For example, voice mail is perceived as having higher social presence than e-mail because you can hear the other person (Keil & Johnson, 2002). Consistent with social presence theory, I maintain that virtual communication makes people feel much less socially present than face-to-face communication. In doing so, virtual communication removes the salience of social categorization that would take place in a face-to-face setting causing women to feel like the out-group in male-dominated teams. Therefore, consistent with previous research I propose that:

- Hypothesis 1: Women in male-dominated teams will report higher levels of inclusion in teams that meet virtually as opposed to face-to-face.

In addition, when the team begins its interaction virtually and social categorization is not salient, a norm of equal participation (Dubrovsky, Kiesler & Sethna, 1991; Siegel et al., 1986) and uninhibited communication (Sproull & Kiesler, 1986) should be established. Again, consistent with the literature on team norms, once norms of behavior are established they are an enduring influence on behavior (Bettenhausen & Murnighan, 1985, 1991; Feldman, 1984), and they are typically not challenged unless the team perceives something dysfunctional is happening and makes a concerted effort to adjust the norms (Feldman, 1984). For teams that begin interacting virtually upon formation, this means that the norms will be established within the virtual setting which has been shown to promote much more inclusion and equal participation among team members than face-to-face settings (Dubrovsky, Kiesler & Sethna, 1991; Siegel et al., 1986). From the perspective of a woman in a male-dominated team, the ability to enter into the conversation during the normative stages of team development establishes her place in the conversation.

To the extent that women have already entered the conversation in the virtual team setting, the norm of inclusion has already been set. In fact, research has shown that with every additional interaction, confidence in applying the team norm to given situations increases and patterns of behavior become more automatic as compared to the first time a team encounters a situation and has to make a conscious decision about how to respond (Bettenhausen & Murnighan, 1985). Therefore, it is likely that the more virtual communication a team has prior to meeting face-to-face, the more embedded in

the conversation the female minority members will become and the easier it will be for them to interact in subsequent face-to-face settings. However, the purpose of this research is primarily to see whether initial virtual communication can have *any* kind of a positive carry over effect into face-to-face settings such that women feel more included in the conversation. Prior research on team norms provides a theoretical basis from which to propose that initial virtual interaction should make it more likely that women will feel included during subsequent face-to-face communication. However, this has never been tested empirically. Therefore:

- Hypothesis 2: Women in male-dominated teams will report higher levels of inclusion in teams that meet using virtual interaction and then face-to-face as opposed to teams that meet face-to-face and then virtually.

Team Process

Participation

Participation is a team process whereby the members have a say in how the team carries out its work, are active in decision-making, and contribute to team discussions (Campion, Medsker & Higgs, 1993). To the extent that people feel included within team discussions, they are more likely to be engaged in team processes. One can see from the qualitative quotes presented earlier that feelings of exclusion and being ignored ultimately caused people to withdraw from the team. On the other hand, when people are made to feel like they are a part of a team and that they are valued and included within the team, they are more likely to participate in the team. For instance, Pearce and Randel (2004) found that employee perceptions of workplace social inclusion were

related to employee engagement at work as demonstrated by performance ratings by their managers. Employees who feel a sense of being included at work are also engaged at work. Eisenberger, Fasolo, and Davis-LaMastro (1990) found a similar phenomenon with the perceived organizational support construct. Employees with higher levels of perceived organizational support were less likely to be absent from work and more likely to perform well. Taken together, these two studies suggest that the more valued and included people feel in organizations, the more they will participate in the task at hand. To the extent the team members feel included within the team, they are more likely to actively participate and engage in the team, regardless of their sex. Therefore:

- Hypothesis 3: Perceptions of inclusion will be positively related to participation in the team. This will be true for both men and women.

Understanding the forces that influence women's participation in male-dominated teams is a complex matter. Theoretically, there are reasons to believe that the low levels of female participation in male-dominated teams can be attributed both to women censoring themselves and to others censoring them. First, in order to understand why women would censor themselves from team discussions in male-dominated teams, it is important to consider both social categorization theory and role expectations. One way in which women socially categorize themselves (Turner, 1985) is by their sex (Ely, 1995). Particularly in male-dominated environments, categorization on the basis of sex becomes very salient to women (Ely, 1995), which means that women are more likely to feel pressure to behave in accordance with stereotypically female behavior. In other words, being salient as a woman is likely to trigger the "role of the woman" for the female. There are many roles which an individual can fill in a social setting (Katz &

Kahn, 1978), and these roles are governed by cultural expectations which dictate how those roles should be carried out (McGrath, 1984). For women who are salient due to being tokens or the "solo" woman (Kanter, 1977), this triggers pressure to conform to stereotypically female behavior such as being nice, sensitive, and agreeable (Heilman, 1995). Otherwise, the woman risks being seen as an "ice queen" and being ostracized for behaving outside of her role (Heilman, 1995; Heilman et al., 2004). This is why women may censor their own behaviors in male-dominated teams, especially when the communication medium is face-to-face and sex is so salient.

Second, the justification for why others would censor female participation in groups is grounded in power and status differentials between males and females. In most countries in the world, women have lower status than men (Glick & Fiske, 1996; Sidanius & Pratto, 1999). These status differentials are very important, because it is well established that team member status is a major contributor to the way individuals are treated in team settings. For instance, a common problem which prevents equal participation of females in male-dominated teams is the issue of process losses resulting from the team interaction. In Steiner's (1972) classic model of team process and productivity, Steiner posited that the productivity of a team was equal to the team's potential minus the inevitable process losses which occurred as a result of the team process. Process losses include production blocking events like getting interrupted or forgetting an idea while waiting to speak. Empirical evidence suggests that females in male-dominated teams may experience a disproportionate number of these production blocking events. Researchers have established that production blocking events are not randomly distributed across team members, but rather, disproportionately targeted at the

lower status group members (Owens, Neale & Sutton, 2000). For example, one study found that 98 percent of the interruptions and 100 percent of the overlaps (i.e., simultaneous speaking) in conversations were made by men (Zimmerman & West, 1975). Recent reviews of workplace diversity have also concluded that:

> . . . one of the factors likely to influence the effectiveness of the group process is preventing group process losses due to status effects. High-status individuals speak longer and more often, take up more space, interrupt members of less powerful group . . . and have more influence. (Konrad, 2003, p. 11)

Hence, one of the process losses may be female input in male-dominated teams.

It is not entirely surprising, then, that females have been shown to enjoy CMC more than males (Gallupe, Bastianutti & Cooper, 1991; Gopal, Miranda, Robichaux & Bostrom, 1997). Perhaps the reason for this higher level of satisfaction is that they feel like they have equal chance for their voices to be heard. Because of its ability to provide anonymity and reduce production blocking events such as waiting to speak or getting interrupted, virtual interaction may be a great equalizer which can remove status differences between people (Dubrovsky, Kiesler & Sethna, 1991; Straus, 1996) and promote equal participation between the sexes in teams. The research that has been conducted to date on virtual teams indicates that when people interact through electronic means that provide anonymity, everyone in the team shares information freely (Cooper et al., 1998; Gallupe, Bastianutti & Cooper, 1991; Sproull & Kiesler, 1986). Given the challenges that females are presented with when communicating in face-to-face team settings (Cleveland et al., 2000), it is logical that females would get to communicate more equally to male peers in virtual settings than in face-to-face settings. By "more

equally" I mean that women will participate more as a proportion of the total number of words and speaking turns in the team. Therefore, consistent with previous research:

- Hypothesis 4: Participation levels between all team members (both men and women) in male-dominated teams will be more equal in teams that interact virtually than in teams that interact face-to-face.

The theoretical opposite of a process loss is a process gain (Hackman, 1987). In response to Steiner's idea of process losses, Hackman introduced the notion of process gains, or "the possibility that teams might perform better if members worked together in ways that *differ* from typical interaction patterns" (Hackman, 1987, p. 319). Hackman's optimistic approach was grounded in the notion that in order to create process gains, researchers need to "test novel patterns of team interaction, ways members can work together that not only reduce process losses but also foster synergistic process gains" (Hackman, 1987, p. 319). That is exactly what this dissertation research is investigating by having mixed-sex teams interact in virtual settings first. In this case, the goal is to minimize the process losses (and move closer to process gains) by creating a setting where the inclusion of women's ideas and voices is more likely.

In order to accomplish this goal, a norm of equal participation among team members should be established. It is important to note here that, in this study, norms of equal participation will be induced by using virtual communication in the teams. The finding that virtual communication produces more equal participation among team members has already been demonstrated by prior research (Dubrovsky, Kiesler & Sethna, 1991; Siegel et al., 1986). I rely on this knowledge and utilize virtual

communication as a mechanism to induce norms of equal participation in teams that initially interact virtually.

Admittedly, it is difficult to know exactly how long it will take for a norm of equal participation to take hold among team members. Bettenhausen and Murnighan (1985, p. 350) referred to the identification of norms as a "difficult methodological issue." Sherif (1936, p. 3) referred to norms as being "among the least visible and most powerful forms of social control over human action." Norms are ambiguous by definition. However, what is clear based on the research of Sherif (1936) and Bettenhausen and Murnighan (1985) is that norms can be established in just a few minutes, and that the length of time it takes for a norm to be established is associated with the length of time that it takes a team to complete a decision-making process together one time.

For instance, Sherif's group norm paradigm study (1936) generated group norms within a matter of minutes. Sherif manipulated the autokinetic phenomenon, a perception phenomena that occurs when people in a completely dark room look at a dot of light that is projected on the wall. The dot is stationary, but to most people it appears to move. Sherif asked the participants how much they thought the dot was moving. When individuals worked alone, they quickly established a range in which their own judgments would fall. That range was their personal norm. However, when individuals worked in teams, all members shifted their judgments so they fell within a common team range. That is, they established a team norm. Then, when individuals worked alone again after having worked in the group, the group norms continued to influence the individual judgments (Sherif, 1936). Therefore, at least in this simple task of perception,

team norms developed in just a few minutes as team members converged on a common range of answers about the movement of the dot.

In a more complex task which required some negotiation about the allocation of money, Bettenhausen and Murnighan (1985) found that team norms were set in as little as seven minutes. These researchers had teams attend four separate sessions. During each session the team made 12 different decisions about allocating money. They gave the teams an unlimited amount of time to make the 12 decisions in each of the four sessions. Across the 19 teams in the investigation, the decision time for the first allocation decision ranged from approximately 30 seconds to 10 minutes. The time it took for all 12 allocations to be made during the first session ranged from 7 to 119 minutes, with a mean of 38 minutes and a median of 25 minutes. Bettenhausen and Murnighan (1985) indicated that the completion of the first team decision-making session was critical and set the norm for the subsequent three sessions. They stated that "it appears that the patterns established in the first sessions decreased both the time necessary for subsequent agreements and the variance" in the subsequent team behavior (Bettenhausen & Murnighan, 1985, p. 364). This provides more evidence that team norms can develop within a few minutes.

Initially interacting within a virtual setting should set a norm of equal participation among team members of sex diverse teams. Because norms govern patterns of member behavior and are relatively enduring and difficult to change (Bettenhausen & Murnighan, 1985, 1991; Feldman, 1984), it is likely that establishing egalitarian patterns of communication during the initial virtual interaction would carry forward into subsequent face-to-face interactions. Once the dialogue has begun with a

team and everyone is participating equally, this sets the norm that in this team everyone participates. It is also possible that having established norms of equal communication will help team members shed their ideas about sex roles when they do come into contact with their other team members face-to-face. Instead of seeing the other members as male or female through a social categorization lens, they may simply think of them as their team members and ascribe fewer sex stereotypical expectations to them. Finally, initial virtual communication may also help women shed any inhibitions that they might have about looking too dominant in face-to-face settings (Heilman, 1995; Heilman et al., 2004). If these women were able to participate as much as they wanted to and share as many ideas as they wanted with their teammates in the virtual setting, why would they not continue to have this right in a face-to-face setting? Therefore, when face-to-face communication occurs after virtual communication, women should participate more as a proportion of the total number of words and speaking turns in the team.

- Hypothesis 5: Women's participation levels in male-dominated teams will be higher in teams that meet using virtual interaction and then face-to-face as opposed to teams that meet face-to-face and then virtually.

Consistent with the theoretical model in Figure 1, the participation process should influence various team outcomes including interpersonal justice perceptions, satisfaction with the team, evaluations from team members, and team performance.

Team Outcomes

Justice Perceptions

Organizational justice is the study of fairness in the workplace. There are four different types of organizational justice (Colquitt, 2001). Distributive justice is based on equity and focuses on the fairness of outcomes (Adams, 1965; Deutsch, 1975; Homans, 1961). Procedural justice refers to the fairness of the processes, or procedures, used to reach outcomes (Thibaut & Walker, 1975). Interpersonal justice focuses on the degree to which people are treated with dignity and respect (Bies & Moag, 1986; Greenberg, 1993). Informational justice focuses on the quality of the explanations given to people about why the procedures were applied a certain way or why the outcomes were distributed in a certain manner (Bies & Moag, 1986).

Within the context of diverse teams, interpersonal justice is the form of justice that is likely to be most critical. This is so because interpersonal justice simply focuses on the way that people treat each other and whether they are treating others with dignity and respect. The other forms of justice are not as appropriate within a group of peers, because they all rely on the involvement of some authority figure. For example, distributive justice relies on the distribution of outcomes (pay, promotion, bonus) and typically comes from a supervisor. Procedural justice also relies on a higher authority, because it represents the fairness of the procedures used to reach that distribution of work outcomes. Finally, even informational justice relies on an authority figure to some extent, because it pertains to the amount of information that is given to people about why certain decisions were made or outcomes were allocated in a given way (Colquitt, 2001).

Therefore, within a small group setting where all team members are peers (such as the present study) the form of justice that is most applicable is interpersonal justice.

Because interpersonal justice deals with the degree to which people are treated with dignity and respect, it is likely to have a large impact upon those individuals who feel that they are excluded from team processes. For example, if team members believe that they are excluded from the team, they are unlikely to feel that they have been treated with dignity and respect by the team, regardless of their sex. Therefore:

- Hypothesis 6: Perceptions of inclusion will be positively related to interpersonal justice judgments. This will be true for both men and women.

Satisfaction with the Team

Satisfaction at work has been described as an emotional reaction to work-related events (Hulin & Judge, 2003). Several models of job satisfaction have also described satisfaction as more of a cognitive process whereby employees weigh various characteristics of their work (Hackman & Oldham, 1976) and the costs and benefits of having their present job compared with alternative employment situations (Hulin, 1991; Smith, Kendall & Hulin, 1969; Thibaut & Kelley, 1959) in order to assess how satisfied they are with their jobs. For the purpose of this study, I focus on satisfaction as the affective reaction that team members have to working with their teammates. Given the nature of the short-term team activity used in this study (which will be described in the methods section), it is most appropriate to capture affective reactions.

If team members have a negative experience working with one another, this will significantly decrease their satisfaction and ability to work together cooperatively in the

future (Hackman, 1987). Within the context of diverse teams, this means that the more problems the team experiences, the less likely it is that this group of people will be satisfied. Diverse team members who lack feelings of inclusion with the team are more likely to feel repelled from the team because they have experienced negative events at work. Researchers who study participation have noted that participation should logically be related to positive outcomes (Pasmore & Fagans, 1992) because it fulfills a human desire for meaningfulness and companionship (Sashkin, 1984). Empirical research has confirmed that participation is positively correlated to satisfaction (Miller & Monge, 1986). At the team level, team members' perceptions of teamwork are positively related to positive evaluations of the team (Harris & Barnes-Farrell, 1997). Taken together, this evidence indicates that the more people feel included in a team, the more likely they are to participate, and ultimately the greater their perceptions of satisfaction with the team, regardless of their sex. Therefore:

- Hypothesis 7: Perceptions of inclusion will be positively related to satisfaction with the team. This will be true for both men and women.

The next hypotheses rely on the logic of *mediation*, whereby the independent variable influences the dependent variable *through* a third variable, known as a mediator (Baron & Kenny, 1986). Per Figure 1, I propose that the relationships between perceptions of inclusion and both job satisfaction and interpersonal justice judgments are mediated by the perceived opportunity to participate. In other words, one's feelings of inclusion influence how much one perceives one has the opportunity to participate, which then affects interpersonal justice judgments and satisfaction with the team. For example, if women in male-dominated teams feel ignored or isolated, they are much less

likely to feel that their work events give them satisfaction. Conversely, as females within diverse teams feel a stronger sense of inclusion with the team, they will feel more comfortable participating in the team. Participation, in turn, should improve perceptions of satisfaction. Consistent with the emergent state—process—outcome framework of Marks, Mathieu, and Zaccaro (2001), feelings of inclusion should be an emergent state which allows people to feel that they are welcome and have the opportunity to participate in the team. Being able to participate in the team should then influence interpersonal justice because having the opportunity to participate should be proximal to the feeling that they were treated with dignity, respect, and courtesy by their team members (Bies & Moag, 1986; Colquitt, 2001). Furthermore, having the opportunity to participate in the team should also be related to satisfaction with the team because prior work has demonstrated that participation in a group is closely related to satisfaction (Miller & Monge, 1986). These predictions should hold for both men and women. Therefore, I propose that:

- Hypothesis 8: Perceived opportunity to participate in the team will mediate the relationship between perceptions of inclusion and satisfaction with team.
- Hypothesis 9: Perceived opportunity to participate in the team will mediate the relationship between perceptions of inclusion and interpersonal justice.

Evaluations from Other Team Members

If certain members of a diverse team are not contributing equally to the discussion, they are unlikely to be evaluated highly by other team members in terms of their contribution to the team. Regardless of the reason why these team members are not

contributing equally to the team (e.g., withdrawing from the team due to feelings of exclusion in the case of women in male-dominated teams), the end result will be that team members may notice that certain members have not contributed very much to the end product. In the best case scenario, the team members who dominate the team discussion may think that quiet team members are shy or simply agree with everything that has been said by the other members. In the worst-case scenario, the team members who dominate the discussion may think that the quiet members are not very bright, are lazy, or are deliberately loafing (Karau & Williams, 1993; Latane, Williams & Harkins, 1979) and do not care to do their fair share of the work. Whatever cause is attributed to certain members' lack of participation, it is likely that they will receive lower evaluations from their team members because they did not participate that much. However, within a virtual setting where everyone can participate more equally, participation problems which are really due to production blocking or sex stereotypes should be lessened. Virtual settings should allow all members to state their ideas and contribute to team discussions. Additionally, prior research shows that team members evaluate each other on the basis of their actual contributions (as opposed to liking) within the context of electronic communication (Weisband & Atwater, 1999). As such, increased women's participation in the virtual team setting should produce higher evaluations for women. Therefore:

- Hypothesis 10: Evaluations of female team members in male-dominated teams will be higher in virtual settings than in face-to-face settings.

In addition, because virtual interaction should allow for women to participate equally with men, this should enhance the evaluations of women in subsequent face-to-

face interactions for two reasons. First, this gives the women ample opportunity to contribute their ideas within the team discussion. Assuming that all members are participating equally, this will allow the other team members to get a sense that everyone is contributing. Second, it sets the norm that all team members contribute equally, which makes it more likely that women will continue to contribute in subsequent face-to-face discussions. Taken together, these things should allow women to contribute more, demonstrate their abilities, and get higher evaluations from team members. Therefore:

- Hypothesis 11: Evaluations of female team members in male-dominated teams will be higher in teams that meet using virtual interaction and then face-to-face interactions as opposed to teams that meet face-to-face and then virtually.

Team Performance

It is well understood that healthy team processes often lead to better team performance (Hackman, 1987). Recent studies on diverse teams have both theorized (van Knippenberg, De Dreu & Homan, 2004) and found that an information elaboration process, whereby team members exchange information and perspectives as part of the group process, leads to better team performance to the extent that it allows a variety of information to be considered (Homan, van Knippenberg, Van Kleef & De Dreu, 2007). This is consistent with the information/decision making perspective of team diversity, which maintains that different perspectives and information in a team should enhance the quality of the work that the team produces (Ancona & Caldwell, 1992; Jehn, Northcraft & Neale, 1999; Williams & O'Reilly, 1998; Zenger & Lawrence, 1989).

Here, it is important to note that this hypothesis is concerned with *equality* of participation among team members. In other words, neither men nor women (nor any one person for that matter) should dominate the team discussion. The whole reason for having a team is to share information among team members with complementary skills and produce a better output for having done so (Kozlowski & Bell, 2003). To the extent that initial virtual interaction can help sex diverse teams avoid the problems associated with social categorization, this should lead those diverse teams to establish more equal norms of participation than teams whose initial interaction is face-to-face. Consistent with the information/decision making perspective of team diversity, I predict that the more equal the participation is among team members in a sex-diverse decision-making team the better that team's performance. Therefore:

- Hypothesis 12: The more equal the team members' participation, the better the team's performance.

A summary of all the hypotheses tested in this dissertation is shown in Table 1.

Table 1
Summary of Dissertation Hypotheses

Hypothesis 1: Women in male-dominated teams will report higher levels of inclusion in teams that meet virtually as opposed to face-to-face
Hypothesis 2: Women in male-dominated teams will report higher levels of inclusion in teams that meet using virtual interaction and then face-to-face as opposed to teams that meet face-to-face and then virtually.
Hypothesis 3: Perceptions of inclusion will be positively related to participation in the team. This will be true for both men and women.
Hypothesis 4: Participation levels between all team members (both men and women) in male-dominated teams will be more equal in teams that interact virtually than in teams that interact face-to-face.
Hypothesis 5: Women's participation levels in male-dominated teams will be higher in teams that meet using virtual interaction and then face-to-face as opposed to teams that meet face-to-face and then virtually.
Hypothesis 6: Perceptions of inclusion will be positively related to interpersonal justice judgments. This will be true for both men and women.
Hypothesis 7: Perceptions of inclusion will be positively related to satisfaction with the team. This will be true for both men and women.
Hypothesis 8: Perceived opportunity to participate will mediate the relationship between perceptions of inclusion and satisfaction with the team.
Hypothesis 9: Perceived opportunity to participate in the team will mediate the relationship between perceptions of inclusion and interpersonal justice.
Hypothesis 10: Evaluations of female team members in male-dominated teams will be higher in virtual settings than in face-to-face settings.
Hypothesis 11: Evaluations of female team members in male-dominated teams will be higher in teams that meet using virtual interaction and then face-to-face interaction as opposed to teams that meet face-to-face and then virtually.
Hypothesis 12: The more equal the team members' participation, the better the team's performance will be.

CHAPTER III

RESEARCH METHODOLOGY

This chapter describes the research methodology used in this investigation. First, I discuss the sample, study design, and power analysis. Second, all of the independent, dependent, and control variables are described. Finally, I will present the procedure describing the way the study was conducted.

Sample

Participants were juniors and seniors in a university setting. They were recruited from two 450-person business classes at a large southwestern university and received extra credit points towards their final grade for participation in the study. In exchange for their participation in the study, they also had a chance to win one of several gift certificates to popular local restaurants. Students were recruited from the same business class in both fall 2007 and spring 2008, for a total of 900 possible participants. Students were recruited from the same business class and taught by the same professor in order to ensure similarity among the participants from semester to semester.

In order to simulate a male-dominated team (which represents the independent variable in Figure 1), participants were grouped into teams of four containing one female and three males. This fulfills Kanter's (1977) description of a male-dominated team, because the female is both in the minority and she is the only one of her sex. As Kanter (1977, p. 208) noted, "If the absolute size of the skewed group is small, tokens can be

solos, the only one of their kind present." This configuration of team members required over-booking each lab session in order to ensure the right number of men and women were present to run the lab. Therefore, the large number of participants was required in order to obtain enough teams and have sufficient power to test the hypotheses.

Study Design

A four-cell experimental design (1 way with 4 levels of the IV) was used to test the hypotheses. The experimental manipulation that took place during the study (which represents the moderator in Figure 1) was the communication type used. Recall that in this study, virtual and face-to-face communication are being manipulated in order to make social categorization by sex more or less salient. This manipulation was operationalized by having one cell that began interacting virtually (low salience) and then moved to face-to-face interaction (high salience). The second cell moved from face-to-face interaction to virtual interaction. The third cell (one control group) interacted face-to-face the entire time. The fourth cell (the second control group) interacted virtually the entire time. This experimental design was selected in order to maximize the internal validity of the study (Figure 2). Because the hypotheses require controlled conditions, whereby teams interact virtually first and then face-to-face, the four-cell experimental design allows this to happen in a controlled environment with control groups and the ability to check for order effects of face-to-face and virtual communication (Shadish, Cook & Campbell, 2002).

Cell 1 Participants interact virtually over a computer chat program for 25 minutes and then switch to face-to-face for 25 minutes	Cell 2 Participants interact face-to-face for 25 minutes and then switch to virtual over a computer chat program for 25 minutes
Cell 3 Participants interact face-to-face the entire 50 minutes	Cell 4 Participants interact virtually over a computer chat program the entire 50 minutes

Figure 2. Communication manipulation.

Power Analysis and Pretest I

In order to estimate the required number of individuals/teams per cell, I looked at effect sizes from published research using similar variables (Thompson, 2005). The most similar study I could find was Dubrovsky, Kiesler, and Sethna (1991) who investigated how email would help lower status team members participate more than in face-to-face settings. In that study, lower status team members were college freshmen and higher status team members were MBA students. Dubrovsky, Kiesler, and Sethna (1991) found that there was a much bigger difference in how much the high and low status team members participated in the face-to-face setting compared to the virtual setting. Their effect size was $d = 1.32$, with the lower status team members participating significantly more in the virtual setting. However, using this study as a benchmark presumes that the difference in status between males and females is comparable to the difference between college freshmen and MBA students. I suspect this effect size estimate may be high for two reasons.

First, I expect the difference between college freshmen and MBA students to be larger because it represents a legitimate difference between the two groups. MBA

students have already earned an undergraduate degree, they often have substantial work experience, and they will have achieved more status and more knowledge of the world and of business than the undergraduates. Therefore, MBAs really do have a higher status in the sense that their educational and professional attainments are superior. The difference between men and women, on the other hand, is not as legitimate because it simply represents one biological sex chromosome over which individuals have no control. The second reason that I expect the reported status difference between MBAs and undergraduates to be greater than the difference between men and women is because people in the United States generally know that blatant sexism is socially unacceptable. For example, laws such as Title VII of the Civil Rights Act were passed to protect individuals from sex discrimination in employment decisions. As a result, sex discrimination tends to manifest in subtle ways (Benokraitis & Feagin, 1995; Glick & Fiske, 1996). This means that people are likely to censor their actions which could be seen as sexist and they are unlikely to admit to blatant sexism.

Therefore, in order to get a better estimate of differences between males and females compared to college freshmen and MBA students, I ran a small pretest with 67 people (from the same management class that was used for the study) in the spring of 2007. Students participated in exchange for extra credit. Of the 67 participants, 33 were female and 34 were male, and the average age was 21. The students were asked to indicate the amount of social status that the four different groups (males, females, MBA graduate students, and college freshmen) have on a scale from 1 to 7 (1 = *low status*, 4 = *neither high nor low status*, and 7 = *high status*). The status for males was $M = 5.70$, $SD = 1.20$. The status for females was $M = 4.79$, $SD = 1.09$. The difference between male

and female status was significant t(66) = 5.32, $p < .01$. Using the effect size conversion formulas from Arthur, Bennett, and Huffcutt (2001), this yields an effect size of d = 1.31. The status for college freshmen was M = 3.43, SD = 1.40. The mean for MBA graduate students was M = 6.25, SD = .93. The difference between freshman and MBA status was significant t(66) = 13.57, $p < .01$. The effect size for this difference was d = 3.34. Therefore, it appears that the difference in status between males and females is smaller than the difference between freshmen and MBAs. Therefore, while Dubrovsky, Kiesler, and Sethna (1991) found a large effect size in their study, I estimate that I may roughly find a medium effect size using male dominated teams. The differences in status between men and women are not as pronounced overall; however, I have a solo woman who will be salient in a group of men (Kanter, 1977). Using the power tables from Cohen (1988), this means that 25 teams per cell are needed in order to get the recommended power of .80 to test cross-cell comparisons. Please see Appendix A for an estimate of how many teams each class (fall and spring) will yield.

In addition, in order to get a preview of the dynamics that might emerge in male-dominated teams within this sample, I asked the 67 males and females who completed the pretest to "recall a time when you were involved in a discussion in a male-dominated team" and tell me up to five adjectives describing "the way you felt during those team discussions." Filling in these adjectives was not a requirement to receive the extra credit. In fact, the instructions said "If you cannot think of five, that's ok. Think of as many as you can." This yielded 211 adjectives which were coded by two graduate students who were blind to the hypotheses. The adjectives were coded into three categories: category 1 meant this adjective represents a positive experience, category 2

meant this was a negative experience, and category 3 meant unsure about the experience. Percent agreement between the two raters was 75 percent, and a third rater was brought in to break the tie on the 25 percent disagreements. In the end, 189 comments could be coded as either positive or negative. Results show that 78 percent of the adjectives written by males recalling a male-dominated team were positive while 22 percent were negative. These percentages are significantly different from equality, which would be expected if there were no significant differences, χ^2 (1) = 29.76, $p < .01$. Males described feeling comfortable, confident, and relaxed. When males made negative adjectives it usually had to do with competitive emotions like anger and determining who the alpha male was. On the other hand, 66 percent of the adjectives written down by females were negative, while 34 percent were positive. These percentages are significantly different from equality, χ^2 (1) = 9.24, $p < .01$. Common adjectives included anxious, nervous, uncomfortable, and out of place. When women reported positive adjectives, they sometimes reported feeling respected or pretty. To summarize, even in this sample of young adults, most of the females already report negative experiences while in male-dominated team discussions. This provides further evidence to support that the phenomena being investigated in this study is both real and important. A list of all the comments can be found in Appendix B.

Measures

Data were collected at two points in time and using two different methods in order to avoid common method variance (Podsakoff, MacKenzie, Podsakoff & Lee, 2004; Podsakoff & Organ, 1986). Variables collected during Time 1 included

demographics and covariates. Variables collected during Time 2 included the emergent state, team process, and outcome variables resulting from the experimental design.

Time 1 Variables

A number of important control variables were collected in Time 1. The purpose of these variables was to control for important alternate explanations for the findings posited in the hypotheses above. Several important individual differences, including extraversion, openness to experience, and core self evaluations were controlled for in the analyses. Extraversion was used as a control, because extraverts enjoy speaking with others in social settings (Goldberg, 1997, 1999). Openness was also measured, because previous research has shown that people who are open to experience enjoy virtual interaction and are more productive in that setting more so than those who are not (Giambatista, 1999). Core self evaluations, a measure of general feelings of self-worth and confidence (Judge, Erez, Bono & Thoresen, 2003) was measured because people with higher core self-evaluations feel better about themselves and therefore may have an easier time feeling included and participating in a social setting. In addition, the Bem Sex Role Inventory (Bem, 1974), a measure of how masculine or feminine an individual self-reports their behavior to be, was utilized. The reason for this is that women and men who see themselves as individuals who ascribe to the gender roles for their sex may be especially likely to behave in sex-stereotyped ways within the context of a male-dominated team.

The big five personality traits Two of the Big Five personality traits (extraversion and openness to experience) were measured because previous research has

shown that the personality of team members affects both team processes and team outcomes (Barrick, Stewart, Neubert & Mount, 1998; Straus, 1996). The Big Five were measured using Goldberg's (1997, 1999) short 10-item per factor scale. Items were measured on a 9-point Likert-type scale ranging from 1 = *extremely inaccurate* to 9 = *extremely accurate*. The items for the scale can be seen in Table 2. The reliability for extraversion was $\alpha = .90$ (Cronbach, 1951), and for openness to experience the reliability was $\alpha = .80$.

Table 2
Big 5 Personality Traits

Extraversion	*Openness to Experience*
1. I have little to say.	11. I have a rich vocabulary.
2. I keep in the background.	12. I have a vivid imagination.
3. I start conversations.	13. I have difficulty understanding abstract ideas.
4. I am quiet around strangers.	14. I have excellent ideas.
5. I am the life of the party.	15. I am full of ideas.
6. I talk to a lot of different people at parties.	16. I am not interested in abstract ideas.
7. I don't like to draw attention to myself.	17. I spend time reflecting on things.
8. I don't mind being the center of attention.	18. I am quick to understand things.
9. I don't talk a lot.	19. I do not have a good imagination.
10. I feel comfortable around people.	20. I use difficult words.

Core self evaluations Core self evaluations (Judge et al., 2003) was used as a covariate, because people who have a high opinion of themselves may be less susceptible to being ignored or excluded from team settings. This was measured using Judge et al.'s 12-item scale. Items were measured using 7-point Likert-type scale

ranging from 1 = *strongly disagree* to 7 = *strongly agree*. The items for core self evaluations are in Table 3. The reliability for this scale was α = .80.

Table 3
Core Self Evaluations

1. I am confident I get the success I deserve in life.
2. Sometimes I feel depressed.
3. When I try, I generally succeed.
4. Sometimes when I fail I feel worthless.
5. I complete tasks successfully.
6. Sometimes, I do not feel in control of my work.
7. Overall, I am satisfied with myself.
8. I am filled with doubts about my competence.
9. I determine what will happen in my life.
10. I do not feel in control of my success in my career.
11. I am capable of coping with most of my problems.
12. There are times when things look pretty bleak and hopeless to me.

Bem sex role inventory Because people who take on male and female sex roles are more likely to succumb to sex role pressures (Bem, 1974), the Bem Sex Role Inventory (BSRI) will be measured. This inventory measures both masculine and feminine behavior. This scale also has neutral items built into it in order to obfuscate matters and not produce any priming effects. These neutral items are not used to compute the BSRI. Because several authors, including Bem, have found that the short form of the BSRI is more reliable than the long form (Bem, 1981; Campbell, Gillaspy & Thompson, 1997; Hoffman & Borders, 2001), the short form was administered. Consistent with the scoring technique of Bem (1974), the inventory was computed by creating an average of the 10 femininity items as well as an average of the 10 masculinity items and then subtracting masculinity from femininity to arrive at the index of androgyny. Items were measured on a 7-point Likert-type scale (1 = *never or almost*

never true to 7 = *almost always true*). The items are in Table 4. Reliability for the masculinity factor was α = .82 and for the femininity factor it was α = .90.

Table 4
Bem Sex Role Inventory

1. defends own beliefs (M)	11. jealous	21. dominant (M)
2. moody	12. leadership ability (M)	22. warm (F)
3. independent (M)	13. sensitive to other's needs (F)	23. willing to take a stand (M)
4. conscientious	14. truthful	24. tender (F)
5. affectionate (F)	15. willing to take risks (M)	25. aggressive (M)
6. assertive (M)	16. understanding (F)	26. adaptable
7. strong personality (M)	17. secretive	27. loves children (F)
	18. compassionate (F)	28. tactful
8. forceful (M)	19. eager to soothe hurt feelings (F)	29. gentle (F)
9. reliable		30. conventional
10. sympathetic (F)	20. conceited	

M = masculinity items; F = femininity items, all others are the neutral social desirability items

Marketing knowledge Finally, because the task in this study was related to marketing, I controlled for how many marketing courses the participants had taken. The reason for this is because participants with more of a marketing background may have found it easier to participate in the activity. This information was collected in the Time 1 web survey.

Time 2 Variables

Manipulation Checks

Two items were used to confirm that everyone noticed there were three males and one female in the experiment. The first item is "In your four-person group, how

many males were there?" Responses ranged from 1 to 4. The second item was "In your four-person group, how many females were there?" Responses ranged from 1 to 4.

To confirm that everyone noticed the manipulation of the study (i.e., virtual or face-to-face communication) the following items were used. "My team communicated face-to-face the entire time to complete the Calgolia team case," "My team communicated over a computer chat program the entire time to complete the Calgolia team case," "My team communicated face-to-face *first* and then over a computer chat program to complete the Calgolia team case," and "My team communicated over a computer chat program *first* and then face-to-face to complete the Calgolia team case." These items were measured on a 7-point Likert-type scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*.

Emergent States

The emergent state in this study, inclusion, is meant to be a subjective measure of affect. It is intended to capture how people affectively react to being placed in a particular setting. As such, the items used to measure inclusion were self reported.

Inclusion Inclusion was measured using Pearce and Randel's (2004) 3-item measure. Responses to the items were measured on a 7-point Likert-type scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. The items are in Table 5. The reliability for this measure was $\alpha = .91$.

Table 5
Inclusion

1. I feel like an accepted part of the team.
2. I feel included in the team activities.
3. Sometimes I feel like an outsider in this team.

Pearce & Randel (2004)

Process

The process variable in this study, participation, was measured using both subjective and objective measures of participation. The self-reported measure helped establish the causal logic in Figure 1, whereby perceived opportunity to participate is a mediator between the emergent state and the outcomes. However, because perceived opportunity to participate and actual participation may be different, it was important to also have an objective measure of actual participation in the discussion.

Objective participation Consistent with other researchers who have conducted content analyses of team discussions in the past (Gersick, 1989; Straus, 1996), the team discussion in each session was coded for participation. The virtual content was captured and saved by the chat program that was used to communicate virtually. The face-to-face content was videotaped and transcribed into document format by a professional transcription service. These transcripts were then analyzed to determine the number of speaking turns and the number of words spoken for each team member as a proportion of the team (Straus, 1996).

Perceived opportunity for participation Self reported perceptions of participation in the team were measured using four items from DeStephen and Hirokawa (1988). Responses to the items were measured on a 7-point Likert-type scale ranging from 1 =

strongly disagree to 7 = *strongly agree*. The items are in Table 6. The reliability for this measure was α = .89.

Table 6
Perceived Opportunity for Participation

1. During the team meeting, I got to participate whenever I wanted to.
2. I believe that the other members of the team liked me.
3. Other members of the team really listened to what I had to say.
4. I felt that I was a genuine member of the team.

DeStephen & Hirokawa (1988)

Outcomes

Interpersonal justice Interpersonal justice was measured using Colquitt's (2001) scale. Responses to the items were measured using Colquitt's 5-point Likert-type scale ranging from 1 = *to a small extent* to 5 = *to a large extent*. The items are in Table 7. The reliability for this measure was α = .80.

Table 7
Interpersonal Justice

1. Have you been treated in a polite manner?
2. Have you been treated with dignity?
3. Have you been treated with respect?
4. Have your team members refrained from improper remarks or comments?

Satisfaction with team Individual member satisfaction with their team was measured using the Faces scale (Kunin, 1955). Responses to the items were measured on a 7 point scale. The items are in Table 8. Reliability for this scale was α = .93.

Table 8
Satisfaction with Team

1 = Big Smile 4 = Neutral 7 = Big Frown

1. Consider your team. Select the face that best expresses how you feel about this team.
2. Consider your team members. Select the face that best expresses how you feel about your team members.
3. Overall, how satisfied are you with this team?

Evaluations from team members Evaluations from team members were based on DeStephen and Hirokawa's (1988) 4-item measure of individual effectiveness. Responses to these items were measured on a 7-point Likert-type scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. The items are in Table 9. All of these items were prefaced with instructions indicating that these items were for research purposes and would in no way affect the team members' extra credit points. I did this because it is established in the human resources literature that developmental ratings are more honest than ratings that are tied to rewards (Smither, London & Reilly, 2005). All four members of each team answered the questions and rated each of the four participants in the team. The average reliability for this scale across the four members of the team was $\alpha = .90$.

Table 9
Evaluation of Team Members

1. I believe (Participant 1,2,3,4) contributed important ideas during the decision-making process.
2. I believe (Participant 1,2,3,4) had a lot of influence on the group's decision-making.
3. (Participant 1,2,3,4) contributed important information during the group's decision-making process.
4. Without (Participant 1,2,3,4), the group would not have come up with a good decision/solution.

DeStephen & Hirokawa (1988)

Team performance Based on a one-page summary that each team produced to justify the decisions made, five independent coders (blind to the hypotheses of the study) rated each team's performance on four different dimensions. Consistent with Montoya-Weiss, Massey and Song (2001), team performance was measured as range, organization, and depth of the team's decision-making process. In addition, the creativity of the team's work was evaluated using the measure of Tierney, Farmer, and Graen (1999). All items were evaluated on a scale ranging from 1 = *to a small extent* to 5 = *to a large extent*. The items are presented in Table 10. Average scale reliability and interrater reliability across the five independent raters who judged team performance will be discussed in the results section.

Table 10
Team Performance

1. This question asks about the *range* of relevant issues considered by the team in the decision-making process. To what extent did the team's decision rationale cover the maximum range of relevant issues?
2. This question asks about the team's *organization*. To what extent was the team's decision rationale well structured and reflective of the interrelationships and intrarelationships among the relevant issues?
3. This question asks about the *depth* of the team's decision-making. To what extent did the team's decision rationale explore issues deeply? (Montoya-Weiss, Massey & Song, 2001)

To what extent do you think this team:

1. Demonstrated originality in its work.
2. Took risks in terms of producing new ideas in doing job.
3. Found new uses of existing methods or equipment.
4. Solved problems that had caused others difficulty.
5. Tried out new ideas and approaches to problems.
6. Identified opportunities for new products/processes.
7. Generated novel, but operable work-related ideas.
8. Served as a good role model for creativity.
9. Generated ideas that were revolutionary. (Tierney, Farmer & Graen, 1999)

Lab Study Procedures

The Task

The task in this study was taken from Montoya-Weiss et al. (2001). It is based on a widely used simulation by Boyd, Walker, and Larréché (1998), and the case involves developing an international marketing strategy for a global company. Because previous research on sex diversity in teams has shown that men tend to dominate the discussion when the task is male-gendered and women tend to dominate when the task is female-gendered (Ritter & Yoder, 2004), it was important to use a gender neutral task.

Therefore, the gender of this task was pre-tested using 59 participants from Pretest I during spring 2007. Participants were given the following description, taken

from Montoya-Weiss et al.'s description of the task, and asked to rate the gender of the task on a 7-point Likert-type scale ranging from 1 = *very masculine task*, 4 = *gender neutral task*, to 7 = *very feminine task*.

- **Task:** Making international marketing recommendations for a global company.
- **Description:** Participants are provided with a brief summary of a case including background information on the company, its market-planning procedures, product and market information, and the results of market surveys. Participants then have to 1) recommend specific marketing strategies for foreign markets and 2) explain their team's rationale for its decision in a one page written summary.

The mean gender score of the task was 3.83, *SD* = .85, indicating that the task is approximately gender neutral. This mean is not significantly different from 4, z = -1.54, $p > .05$.

The Procedure

The study was conducted in two parts. A web survey was used to collect individual difference variables and demographics at Time 1. Time 2 involved a two-hour lab study and was conducted in a classroom. Students who participated in Time 1 signed up for times to participate in teams of four people (3 men and 1 woman) in Time 2. The sign-up process for Time 2 was set up so that only six men and five women could sign up for each session. This was done using a combination of distribution lists

(one for men, one for women) and web pages which only allowed a certain number of people to sign up for each session. This process was invisible to the participants.

In Time 2, which began two weeks after the Time 1 deadline, participants came to a classroom where they participated in the team exercise. Upon arrival at the lab, participants were greeted by the same male experimenter (who ran the lab in both fall 2007 and spring 2008). The experimenter was male because the purpose of this study is to simulate a male-dominated setting, and research has shown that females are more confident and more vocal when the authority figure in a setting is female (Kimmell, 2000; Wood, 1994).

The experimenter invited four participants (3 men and 1 woman) into the lab and the extra seven people got an alternate task containing other studies which they filled out at the tables in the hallway. The experimenter told participants that everyone had been randomly assigned to either do the study or the alternate task. In reality, he selected the first woman and three men who arrived at the door. Once the four participants entered the room, the experimenter asked them to sit down and gave them 10 minutes to read through the case silently. After 10 minutes were up, the experimenter instructed them to work on the team deliverables which involved filling out a Team Decision Form and writing a one-page summary explaining the major decisions they documented in this form. Each team was randomly assigned to a condition. Depending on what condition they were in, the experimenter either asked them to sit down around a conference table (in the face-to-face condition) or at individual computer terminals with cubicle walls dividing them (in the virtual first then face-to-face condition). The team had a total of one hour to work on the case. The first 50 minutes (two 25 minute segments) were used

to fill in the Team Decision Form. The last 10 minutes were used to write a one-page summary of justification for the major decisions made. Teams were first given 25 minutes. This should have allowed enough time for norms to develop, as Sherif (1936) established group norms within a few minutes, and Bettenhausen and Murnighan (1985) observed repeated patterns of team behavior in teams whose initial session of 12 allocation decisions was as short as 7 minutes. There are several important differences between the task in this study and that of Bettenhausen and Murnighan (1985). First, Bettenhausen and Murnighan told their participants they had an infinite amount of time to make decisions, which probably means that some teams took an exaggerated amount of time to finish the first 12 allocations in Session 1 because they had no time pressure. Second, Bettenhausen and Murnighan forced participants to make 12 allocation decisions in each session. Because of this, we do not know whether it takes 12 or fewer agreements to develop team norms. Third, Bettenhausen and Murnighan used five-person teams, and all five people had to reach a consenses on each of the 12 allocations. To summarize, the Bettenhausen and Murnighan study gave participants unlimited time, required them to make 12 decisions in one session, and had five-person teams. All three of these factors likely exaggerated the amount of time it took for the teams to finish the 12 allocations in Session 1, the session where team norms developed.

Still, to be conservative, participants in the present study were told that they had 25 minutes to fill out the first half of the Team Decision Form. This provided enough time for the four-person teams to make multiple decisions, because the median time required per allocation decision for the five-person teams in the Bettenhausen and Murnighan (1985) study was about two minutes. This is also equal to the the 25 minute

median amount of time that it took Bettenhausen and Murnighan's five-person teams to establish team norms by making the 12 allocations in untimed conditions during the first session.

Once 25 minutes were up, the experimenter let everyone know that half their time was up. The experimenter then gave participants another 25 minutes to continue the team discussion. For the teams in the conditions that switched between virtual and face-to-face communication, they moved from whichever communication medium they began working in to the other communication medium. This entailed standing up and walking to the computer terminals or a conference table, both of which are set up in the same room. After the next 25 minutes were up, the experimenter gave all the teams an additional 10 minutes to type up a one-page summary describing the rationale behind their decisions. Next, the participants filled out a survey. This survey included the emergent state (inclusion), self-reported participation and interpersonal justice perceptions, as well as satisfaction with the team and evalutions of other team members. On the last page of the survey, students were asked what they thought the purpose of the study was and whether they had any comments about the study. Once the participants answered the questions, they turned in the survey and left the classroom. Before leaving the room, each participant was thanked for participating and given a debriefing sheet explaining the purpose of the study and asking them to not discuss the study with anyone in their classes. All face-to-face team interactions in Time 2 of the study were video/audio taped and transcribed by a professional transcription service so that the content could be analyzed for the objective measure of participation.

Pretest 2

A second pretest was conducted during Summer Session II in 2007 in order to test that the experimental procedure and the task described above were working as planned. The lab protocol and materials were refined using 16 three-person teams (1 woman and 2 men) in order to prepare for the full-scale data collection in fall 2007/spring 2008.

CHAPTER IV

RESULTS

This results section contains analyses performed at the individual and team levels. First, demographic information about the sample is presented as well as the results of the manipulation checks. Second, confirmatory factor analyses for the measures are shown. Because I collected several scales at the same time in both Phase 1 and Phase 2 of the study, I ran a confirmatory factor analysis (CFA) for both phases in LISREL (8.52) to establish the discriminant validity of all the measures in the study. Third, intercorrelations, descriptive statistics, and reliability coefficients are presented. Finally, hypotheses are tested and results are reported.

Demographic Profile of the Sample

As discussed in Chapter III, the participants came from large undergraduate business classes. The original sample for the study included 332 people grouped in 83 four-person teams. However, one team was removed due to insubordination and two women were removed from the sample because they guessed that the purpose of the study was related to sex roles of men and women in teams. Therefore, the final sample consisted of 326 individuals across 82 teams. Twenty-six of these teams were in the virtual then face-to-face condition, 27 were in the face-to-face then virtual condition, 15 were in the face-to-face only condition, and 15 were in the virtual only condition. The mean age of the participants was 21 years (SD = 1.22). Seventy-six percent of the

participants were male, while 24 percent were female. The demographic breakdown of the sample was 85 percent Caucasian, 2 percent African-American, 8 percent Latino, 3 percent Asian-American, and 1 percent other. Ninety-seven percent of the participants reported that English was their first language. Forty-six percent of the students were currently employed, while the other 54 percent were not employed. Forty percent of the participants reported having at least one year of full-time work experience, and 81 percent reported having at least one year of part-time work experience.

Manipulation Checks

The first manipulation check in the study asked participants to identify how many males and females were present in the group to ensure that the social categorization manipulation was salient. All of the participants correctly identified that there were three men and one woman per team.

The second manipulation check asked participants to identify which communication medium they used to complete the Calgolia team case: virtual then face-to-face, face-to-face then virtual, virtual only or face-to-face only. One hundred percent of the participants correctly identified the manipulation that they were in by saying "yes" to the correct manipulation check question. Ninety-eight percent of the participants (319 out of 326) said "yes" to the question about the scenario and "no" to all the other scenarios. The seven participants who said "yes" to their condition in addition to some other condition were retained after individual inspection of their data, because their data demonstrated that they were serious participants. Their data all showed signs of thoughtful answers, and the experimenter detected no frivolous or unusual behavior with

the participants. Furthermore, their answers simply showed signs of a very literal interpretation of the events of the lab. For example, one person who was in the virtual only condition identified that they were in the virtual only condition but also identified that they were in the face-to-face then virtual condition. Technically the participants did enter the room and sit together at a table to read the case for 10 minutes before they were instructed to complete the case virtually. Similar rationalizations can be made for the six people who marked more than one answer in the manipulation checks. Therefore, these data were retained.

Confirmatory Factor Analyses

The results for Phase 1 indicated that a five-factor solution (core self evaluations, extraversion, openness to experience, masculinity and femininity) was a good fit for the data (χ^2 = 3301.17, df = 1264, CFI = .90, IFI = .90, RMSEA = .07; SRMR = .09). All but one of the items in the BSRI masculinity scale loaded well onto its intended factor. According to Tabachnick and Fidell (2001), item loadings onto their intended factors should be .32 or above. This one item from the masculinity scale had a low loading (.22). However, a check of the reliability for this scale revealed that removing this item would not change Cronbach alpha reliability (alpha would be .82 either way). Therefore, because this item is part of an established scale, it was retained.

A five-factor solution was a much better fit to the data than a four-factor solution where masculinity and femininity were collapsed into one factor (χ^2 = 3980.42, df = 1268, CFI = .87, IFI = .87, RMSEA = .10; SRMR = .12). A five-factor solution was also a better fit to the data than a three-factor solution where masculinity and femininity

formed one factor, extraversion and openness to experience formed a second factor, and core self evaluations formed a third factor (χ^2 = 4553.54, df = 1271, CFI = .84, IFI = .84, RMSEA = .12; SRMR = .13). A five-factor solution was also a better fit to the data than a two-factor solution where core self evaluations, extraversion, and openness to experience formed one factor and masculinity and femininity formed the second factor (χ^2 = 5134.78, df = 1273, CFI = .81, IFI = .81, RMSEA = .13; SRMR = .13). A five-factor solution was also better than a one-factor solution (χ^2 = 6690.64, df = 1325, CFI = .74, IFI = .74, RMSEA = .16, SRMR = .17).

The results for Phase 2 indicated that a four-factor solution (perceptions of inclusion, perceived opportunity to participate, satisfaction with team, and interpersonal justice) was a good fit for the data (χ^2 = 200.85, df = 71, CFI = .98, IFI = .98, RMSEA = .07, SRMR = .06). However, one item from the inclusion scale had a factor loading that was just under the Tabachnick and Fidell recommendation. While the other two items in the scale had loadings of .91 and .92, this item's loading was .31. The item in question was the reverse-scored item, and there is literature which states that negatively worded items reduce the validity of responses (Schriesheim & Hill, 1981) and introduce systematic error into a scale (Jackson, Wall, Martin & Davids, 1993; Schmitt & Stults, 1985). A check of the scale reliability with and without the item in question also demonstrated that the scale reliability would drop from alpha of .91 (without the item) to alpha of .72 (with the item). For these reasons, and because these items are not from a validated scale, the reverse scored item was dropped.

The updated four-factor CFA without that item was also a very good fit for the data (χ^2 = 119.31, df = 59, CFI = .99, IFI = .99, RMSEA = .05, SRMR = .04). In fact,

the fit was significantly better than the previous four-factor model with the reverse-scored item χ^2 difference = 81.54 (12), $p < .05$. In addition, a four-factor solution was a much better fit to the data than a three-factor solution where perceptions of inclusion and perceived opportunity to participate were collapsed into one factor (χ^2 = 336.61, df = 62, CFI = .95, IFI = .95, RMSEA = .11, SRMR=.05). A four-factor solution was also a better fit to the data than a two-factor solution where perceptions of inclusion and perceived opportunity to participate formed one factor while satisfaction with team and interpersonal justice formed the second factor (χ^2 = 1303.87, df = 64, CFI = .79, IFI = .79, RMSEA = .23, SRMR = .15). A four-factor solution was also better than a one-factor solution (χ^2 = 1867.97, df = 65, CFI = .70, IFI = .70, RMSEA = .28, SRMR = .15).

Descriptive Statistics and Correlations

Means, standard deviations and inter-correlations are presented in Table 11.

Table 11

Means, Standard Deviations, Inter-correlations, and Reliabilities

	M	*SD*	1	2	3	4	5	6
1. Age	20.57	1.22						
2. Sex	.76	.43	.12*					
3. Race	.86	.35	-.05	-.08				
4. Marketing Knowledge	1.77	.90	.18**	-.17**	.01			
5. Core Self Evaluations	3.89	.58	-.04	.07	.12*	-.03	(.80)	
6. Extraversion	5.99	1.43	-.05	-.14*	-.01	.22**	.25**	(.90)
7. Openness to Experience	6.19	1.04	.06	.14*	.02	.04	.25**	.36**
8. Bem Sex Role Inventory	-.01	2.43	-.07	-.28**	-.04	-.06	-.17**	-.16**
9. Perceptions of Inclusion	5.69	1.11	.04	.03	.03	-.07	.19**	.16**
10. Perceived Opportunity for Participation	5.70	.97	-.01	.04	.01	-.06	.19**	.20**
11. Satisfaction with Team	5.74	1.11	-.03	.01	.01	-.02	.10	.17**
12. Interpersonal Justice Judgments	4.71	.61	-.02	-.07	.01	-.10	.09	.03
13. Ratings from Peers	5.39	.87	.05	.07	.10	.04	.06	.08
14. Person Proportion of Speaking Turns	.25	.10	.05	-.04	.10	-.04	.11*	.19**
15. Person Proportion of Words	.25	.14	-.01	.01	.14**	-.06	.09	.21**

Table 11
Continued

	7	8	9	10	11	12	13	14
1. Age								
2. Sex								
3. Race								
4. Marketing Knowledge								
5. Core Self Evaluations								
6. Extraversion								
7. Openness to Experience	(.80)							
8. Bem Sex Role Inventory	-.13*	(.82M .90F)[a]						
9. Perceptions of Inclusion	.16**	-.06	(.91)					
10. Perceived Opportunity for Participation	.19**	-.04	.68**	(.89)				
11. Satisfaction with Team	.12*	.11*	.34**	.51**	(.93)			
12. Interpersonal Justice Judgments	.07	.10	.26**	.40**	.32**	(.80)		
13. Ratings from Peers	.13*	-.05	.35**	.33**	.26**	.06	(.90)[b]	
14. Person Proportion of Speaking Turns	.17**	-.11*	.30**	.18**	.05	.01	.54**	
15. Person Proportion of Words	.16**	-.13*	.28**	.17**	.05	-.02	.54**	.92**

Note: $N = 326$. Reliabilities are in parentheses on the diagonal.
Two-tailed tests.
* $p \leq .05$; ** $p \leq .01$
[a] The masculinity factor of the Bem Sex Role Inventory had Cronbach alpha reliability of .86 while the femininity factor had reliability of .83
[b] This represents the average reliability for the measure across the four team members
Sex coded as 0 = female; 1 = male. Race coded as 0 = non Caucasian; 1 = Caucasian

Hypothesis Testing

In order to test the hypotheses, only the people who pertain to the hypothesis in question were included in the analysis. The purpose of this approach is to present only the information relevant to test each hypothesis. However, this means that the sample size will change across analyses. For hypotheses that include everyone (men and women) the sample size will be 326. For hypotheses that include women only in the conditions that switch between virtual and face-to-face communication, the sample size will be 50. For hypotheses that include women only in the purely virtual and face-to-face conditions, the sample size will be 30.

Furthermore, when comparisons across experimental conditions were made, only comparisons across two pairs of cells were made: 1) the virtual then face-to-face and face-to-face then virtual cells, and 2) the virtual only and the face-to-face only cells. The reason for this is that the only difference between the virtual then face-to-face and face-to-face then virtual cells is the order of communication. Likewise, the only difference between the virtual only and the face-to-face only cells is the medium of communication. Comparisons across any other combination of cells would present a confound, namely, that they would differ on multiple dimensions: the type of communication, the order of communication, and the length of time in each communication medium. Therefore, in order to avoid such a confound, only the above mentioned comparisons across cells were made. Comparisons made across the virtual

then face-to-face and face-to-face then virtual cells had a sample size of 206. Comparisons across the virtual only and face-to-face only cells had a sample size of 120.

Hypothesis 1 stated that females in male-dominated teams would feel more included when the means of communication was virtual as opposed to face-to-face. For this analysis, only the women in the virtual only and face-to-face only condition were included. An analysis of covariance (ANCOVA) on feelings of inclusion with race, age, core self evaluations, extraversion, openness, marketing knowledge, and the Bem Sex Role Inventory as covariates produced statistically significant results $F_{(1,21)} = 6.08$, $p < .05$, partial $\acute{\eta}^2 = .22$. However, the means were in the opposite direction of the hypothesis. Women in the face-to-face only condition reported higher inclusion ($M = 6.30$, $SD = .53$) than women in the virtual only condition ($M = 5.07$, $SD = 1.31$). Therefore, Hypothesis 1 was not supported. The complete results of the ANCOVA are shown in Table 12.

Table 12
Results of ANCOVA for Hypothesis 1

Variable	df	p	Mean Square	F	p	partial $\acute{\eta}^2$
Race	1	0.45	4.58	0.59	0.45	.03
Age	1	0.36	0.97	0.90	0.36	.04
Core Self Evaluation	1	0.77	0.10	0.09	0.77	.00
Extraversion	1	0.93	0.01	0.01	0.93	.00
Openness	1	0.28	1.34	1.24	0.28	.06
BSRI	1	0.52	0.47	0.43	0.52	.02
Marketing Knowledge	1	0.55	0.41	0.38	0.55	.02
Manipulation	1	0.02	6.58	6.08	0.02	.22
Error	21		1.08			
Total	30		22.73			

N = 30

Hypothesis 2 stated that women in male-dominated teams would report higher levels of inclusion in teams that met using virtual interaction and then face-to-face as opposed to face-to-face first and then virtual. For this analysis, the women in the virtual then face-to-face and face-to-face then virtual conditions were included. An ANCOVA on feelings of inclusion with race, age, core self evaluations, extraversion, openness, marketing knowledge, and the Bem Sex Role Inventory as covariates produced statistically significant results $F_{(1,41)} = 4.66$, $p < .05$, partial $\acute{\eta}^2 = .10$. The means were also in the predicted direction of the hypothesis. Women in the virtual then face-to-face condition reported higher inclusion ($M = 5.94$, $SD = .94$) than women in the face-to-face then virtual condition ($M = 5.25$, $SD = 1.38$). Therefore, Hypothesis 2 was supported. The complete results of the ANCOVA are shown in Table 13.

Table 13
Results of ANCOVA for Hypothesis 2

Variable	df	Sums of Square	Mean Square	F	p	partial $\acute{\eta}^2$
Race	1	0.53	0.53	0.38	0.54	.01
Age	1	0.14	0.14	0.10	0.75	.00
Core Self Evaluation	1	1.37	1.37	0.96	0.33	.02
Extraversion	1	0.07	0.07	0.05	0.83	.00
Openness	1	0.10	0.10	0.07	0.79	.00
BSRI	1	2.14	2.14	1.50	0.23	.04
Marketing Knowledge	1	0.01	0.01	0.01	0.95	.00
Manipulation	1	6.65	6.65	4.66	0.04	.10
Error	41	58.46	1.43			
Total	50	1638.66				

N = 50

Hypothesis 3 stated that perceptions of inclusion would be positively related to participation in the team. Initial support for this hypothesis can be found in Table 1,

where inclusion is positively correlated to perceived opportunity to participate (r = .68, $p < .01$) as well as objective participation as a proportion of the number of words ($r = .28$, $p < .01$) as well as the number of speaking turns in the team ($r = .30$, $p < .01$). Final support for Hypothesis 3 is subsumed within the test of Hypotheses 6 and 9 below.

Hypothesis 4 stated that participation levels between team members in male-dominated teams would be more equal in teams that interact virtually than in teams that interact face-to-face. Consistent with Siegel et al. (1986), equality of participation was measured as the standard deviation of the number of remarks per group member. A t-test comparing the standard deviation of the proportion of words spoken for the teams in the face-to-face only condition to the teams in the virtual only condition demonstrated that the teams in the virtual condition had a smaller standard deviation ($M = .12$, $SD = .05$) and thus participated more equally than teams in the face-to-face only condition ($M = .18$, $SD = .05$). This difference in means was statistically significant $t(28) = 3.33$, $p < .05$, $d = 1.22$ (see Arthur, Bennett & Huffcutt, 2001 for effect size conversion formula). The same pattern emerged using the standard deviation of the number of speaking turns. Teams in the virtual only condition had a smaller standard deviation of speaking turns ($M = .13$, $SD = .04$) than teams in the face-to-face only condition ($M = .10$, $SD = .06$). However, this difference in means was not statistically significant $t(28) = 1.56$, $p > .05$, $d = .57$ (Arthur, Bennett & Huffcutt, 2001). Therefore, Hypothesis 4 was only partially supported.

Hypothesis 5 stated that female participation levels in male-dominated teams would be higher in teams that interacted using virtual communication and then face-to-

face as opposed to teams that met face-to-face and then virtually. In order to test this hypothesis, the women in the virtual then face-to-face condition and the face-to-face then virtual condition were included. The women in the virtual then face-to-face condition spoke slightly more as a proportion of the total words in the team (M = .25, SD = .15) as compared to the women in the face-to-face then virtual condition (M = .24, SD = .14). However, this difference was not statistically significant t(48) = .25, $p > .05$, d = .07. The women in the virtual then face-to-face condition spoke slightly less as a proportion of the total speaking turns in the team (M = .25, SD = .11) as compared to the women in the face-to-face then virtual condition (M = .26, SD = .10). This difference was not statistically significant t(48) = -.19, $p > .05$, d = -.05. Therefore, Hypothesis 5 was not supported.

In order to test Hypotheses 6 through 9, I conducted a mediated regression test following the Baron and Kenny's (1986) method. According to Baron and Kenny, testing for mediation consists of four steps. First, the independent variable must be related to the dependent variable (Step 1). Second, the independent variable must be related to the mediator (Step 2). Third, the mediator must be related to the dependent variable while controlling for the independent variable (Step 3). Finally, a previously significant relationship between the independent and dependent variables must be reduced in the presence of the mediator (Step 4). If the coefficient is reduced or drops in significance, then partial mediation is supported. If the coefficient loses significance and the indirect effect is statistically significant (Sobel, 1982), then full mediation is supported.

The results based on Baron and Kenny's method are in Tables 14, 15, and 16. Hypothesis 6 stated that perceptions of inclusion will be positively related to interpersonal justice judgments. Model 2 in Table 14 demonstrates that the relationship between perceptions of inclusion and interpersonal justice judgments is positive and significant ($\beta = .24$, $p < .001$), supporting Hypothesis 6 and fulfilling Step 1 of the Baron and Kenny's method. Hypothesis 9 predicted that the relationship between perceptions of inclusion and interpersonal justice judgments would be mediated by perceived opportunity to participate. Model 2 of Table 15 shows that perceptions of inclusion are positively and significantly related to opportunity to participate ($\beta = .65$, $p < .001$). This satisfies Step 2 of Baron and Kenny's procedure. (This also provides final support for Hypothesis 3, which posited that perceptions of inclusion would be positively related to perceived opportunity to participate). In Step 3, the effect of the independent variable is controlled to evaluate the relationship between the mediator and outcome variable. Model 3 in Table 14 shows that when perceived opportunity to participate is added to the model, the effect of perceptions of inclusion on interpersonal justice judgments is reduced and loses significance ($\beta = -.03$, $p > .05$) while the effect of perceived opportunity to participate on interpersonal justice judgments is strong and significant ($\beta = .42$, $p < .001$). This supports full mediation, and Sobel's test for the significance of the indirect effect is significant ($z = 5.43$, $p < .001$). Therefore, Hypothesis 9 was supported.

Table 14

Testing the Mediating Role of Perceived Opportunity to Participate in the Relationship between Perceptions of Inclusion and Interpersonal Justice Judgments (Baron & Kenny Steps 1 and 3)

	Interpersonal Justice		
Variables	Model 1	Model 2	Model 3
Age	.02	.01	.01
Sex	-.08	-.08	-.10
Race	.00	-.01	-.01
Marketing Knowledge	-.12*	-.09	-.08
Core Self Evaluations	.09	.06	.04
Extraversion	.01	-.02	-.06
Openness to Experience	.06	.05	.02
Bem Sex Role Inventory	.10	.10	.05
Perceptions of Inclusion		.24***	-.03
Perceived Opportunity to Participate			.42***
R^2	0.04	0.09***	0.19***
$R^2 \Delta$ beyond Model 1	--	0.05***	0.15***

N = 326

Standardized coefficients. Two-tailed tests reported.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 15

Regressing Perceived Opportunity to Participate on Control Variables and Perceptions of Inclusion (Baron & Kenny, Step 2)

	Perceived Opportunity to Participate	
Variables	Model 1	Model 2
Age	.01	-.03
Sex	.05	.05
Race	.01	.00
Marketing Knowledge	-.08	-.01
Core Self Evaluations	.13*	.04
Extraversion	.17**	.09
Openness to Experience	.11	.06
Bem Sex Role Inventory	.11	.11*
Perceptions of Inclusion		.65***
R^2	0.09***	0.48***
$R^2 \Delta$ beyond Model 1	--	0.39***

N = 326

Standardized coefficients. Two-tailed tests reported.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 16
Testing the Mediating Role of Perceived Opportunity to Participate in the Relationship between Perceptions of Inclusion and Satisfaction with Team (Baron & Kenny Steps 1 and 3)

	Satisfaction with Team		
Variables	Model 1	Model 2	Model 3
Age	-.01	-.03	-.02
Sex	.06	.06	.04
Race	.01	.01	.01
Marketing Knowledge	-.04	-.01	.00
Core Self Evaluations	.06	.02	-.01
Extraversion	.19**	.15*	.11
Openness to Experience	.05	.03	.00
Bem Sex Role Inventory	.18**	.18**	.12*
Perceptions of Inclusion		.31***	.01
Perceived Opportunity to Participate			.47***
R^2	0.07	0.16***	0.27***
R2 Δ beyond Model 1	--	0.09***	0.20***

N = 326
Standardized coefficients. Two-tailed tests reported.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

As a robustness check, I ran a reverse causal model where perceived opportunity to participate was the independent variable and perceived inclusion was the mediator. There was no evidence of mediation, which provided further support for the theoretical model.

Hypothesis 7 stated that perceptions of inclusion will be positively related to satisfaction with the team. Model 2 in Table 16 demonstrates that the relationship between perceptions of inclusion and satisfaction with the team is positive and significant ($\beta = .31$, $p < .001$), supporting Hypothesis 7 and fulfilling Step 1 of the Baron and Kenny's method. Hypothesis 8 predicted that the relationship between perceptions of inclusion and satisfaction with team would be mediated by perceived opportunity to

participate. Model 2 of Table 15 shows that perceptions of inclusion are positively and significantly related to opportunity to participate ($\beta = .65$, $p < .001$). This satisfies Step 2 of Baron and Kenny's procedure. Model 3 in Table 16 shows that when perceived opportunity to participate is added to the model, the effect of perceptions of inclusion on satisfaction with team is reduced and loses significance ($\beta = .01$, $p > .05$) while the effect of perceived opportunity to participate on satisfaction with team is strong and significant ($\beta = .47$, $p < .001$). This supports full mediation, and Sobel's test for the significance of the indirect effect is significant ($z = 6.28$, $p < .001$). Therefore, Hypothesis 8 was supported.

As a robustness check, I again ran a reverse causal model where perceived opportunity to participate was the independent variable and perceived inclusion was the mediator. There was no evidence of mediation, which provided further support for the theoretical model.

Hypothesis 10 stated that evaluations of female team members in male-dominated teams would be higher in virtual settings than in face-to-face team settings. In order to test this hypothesis, the ratings of the three male team members for the female team member were aggregated. To ensure the appropriateness of this aggregation process, the intraclass correlation coefficient, ICC(2) was calculated using a one-way model with random row effects (Bliese, 2000; James, 1982). The value for ICC(2) was .59, which is adequate to justify aggregating the three raters (Atwater, Ostroff, Yammarino & Fleenor, 1998). In order to test this hypothesis, ratings of the women in the virtual only and the face-to-face only conditions were used. Contrary to

the hypothesis, women in the face-to-face only condition received higher ratings (M = 5.43, SD = .95) than women in the virtual only condition (M = 4.87, SD = .89). However, this difference was not statistically significant t(28) = 1.69, $p > .05$, d = .62. Therefore, Hypothesis 10 was not supported.

Hypothesis 11 stated that evaluations of female team members in male-dominated teams will be higher in teams that meet using virtual interaction and then face-to-face interaction as opposed to teams that meet face-to-face and then virtually. To test this hypothesis, the team member ratings for women in the face-to-face then virtual and the virtual then face-to-face condition were included. Results showed that women in the virtual then face-to-face condition received higher ratings (M = 5.49, SD = .93) than the women in the face-to-face then virtual condition (M = 5.23, SD = 1.10). However, this difference was not statistically significant t(48) = .90, $p > .05$, d = .25. Therefore, Hypothesis 11 was not supported.

Hypothesis 12 stated that the more equally team members participated, the better the team's performance would be. In order to test this hypothesis, ratings of team performance from five independent raters (all blind to the hypotheses of the study) were aggregated. The average Cronbach alpha for the performance measure across the five independent raters was .82. The average Cronbach alpha for the creativity measure across the five raters was .95. ICC(2) for the three raters was .69 for the three-item performance measure, and ICC(2) was .68 for the nine-item creativity measure, which justifies aggregation. In order to support this hypothesis, I would expect that the standard deviation of the participation on the team (Dubrovsky, Kiesler & Sethna, 1986)

would be negatively related to the independent ratings of team performance. In other words, the more evenly the team members are contributing to the team, the better they perform. Team-level correlations are presented below in Table 17. Based on the 82 teams in the sample, results show that the relationship between the standard deviation of the proportion of words on the team is negatively related to both performance (r = -.12, p > .05) and to creativity (r = -.08, p > .05). However, these correlations were not significant. The standard deviation of the proportion of speaking turns on the team is also negatively related to both performance (r = -.34, p < .01) and creativity (r = -.31, p > .01). These correlations were significant. Therefore, Hypothesis 12 was partially supported.

Table 17
Team-level Means, Standard Deviations, Inter-correlations

		M	***SD***	1	2	3	4	5
1.	Team total Spturns	292.06	114.30					
2.	Team total Words	3087.29	1168.94	.88**				
3.	SD Team Member Proportion Spturns	.11	.04	-.19	-.06			
4.	SD Team Member Proportion Words	.15	.06	-.15	.04	.82**		
5.	Team Performance Rating	2.71	.64	.22*	.23*	-.34**	-.12	
6.	Team Creativity Rating	2.55	.60	.25*	.29*	-.31**	-.08	.91**

N = 82
* p < .05; ** p < .01

In order to conduct a more rigorous test of Hypothesis 12, I ran two additional analyses including two team-level control variables. The two control variables are team-level task specific knowledge, measured as the sum of the number of marketing classes taken by the members of each team, and overall academic achievement, measured as the sum of all the team members' GPAs for each team. (Note that GPA had been collected

during the Phase 1 web survey for the purpose of using it as a control variable in this analysis). I first regressed team performance on the standard deviation in team person proportion of speaking turns, controlling for team GPA and team marketing knowledge. The results displayed in Table 18 show that the effect of the standard deviation in team person proportion of speaking turns holds even when team GPA and marketing knowledge are controlled ($\beta = -.33$, $p < .01$).

Table 18
Regressing Team Performance on Control Variables and SD in Team Person Proportion of Speaking Turns

	Team Performance	
Variables	Model 1	Model 2
Team GPA	.16	.07
Team Marketing Knowledge	.07	.02
SD in Team Person Proportion of Speaking Turns		-.33**
R^2	.01	0.12**
$R^2 \Delta$ beyond Model 1	--	0.10**

N = 82
Standardized coefficients. Two-tailed tests reported.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The second regression involved regressing team creativity on the standard deviation in team person proportion of speaking turns, controlling for team GPA and team marketing knowledge. The results displayed in Table 19 show that the effect of the standard deviation in team person proportion of speaking turns holds even when team GPA and marketing knowledge are controlled ($\beta = -.31$, $p < .01$).

Table 19
Regressing Team Creativity on Control Variables and SD in Team Person Proportion of Speaking Turns

Variables	Team Creativity	
	Model 1	Model 2
Team GPA	.12	.04
Team Marketing Knowledge	.01	-.03
SD in Team Person Proportion of Speaking Turns		-.31**
R^2	.01	0.10**
$R^2 \Delta$ beyond Model 1	--	0.09**

N = 82
Standardized coefficients. Two-tailed tests reported.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Therefore, the effects hold even when control variables are included. The standard deviation of the team person proportion of speaking turns is negatively related to both team performance and team creativity, suggesting that the more evenly the team members contribute ideas, the better the team performs. (Note that because of the high inter-correlation between the team performance and creativity measures ($r = .91$, $p < .01$), the two measures could have easily been combined and treated as one overall performance measure. However, the analyses were kept separate because they were presented as two different performance measures in the methods section of the dissertation).

Finally, in order to provide a more comprehensive test of the model as a whole, a number of path analyses containing all of the individual-level variables in the model were conducted. The analyses were conducted using LISREL 8.52 in order to estimate all the variables simultaneously and assess model fit. In order to determine how best to test the model using a path analysis, I followed the methodology of Mathieu and Button

(1992) who tested a four-stage moderated model based on an experimental design. In addition, because the theoretical model to be tested includes both moderation and mediation, I relied on the work of Edwards and Lambert (2007) who provided guidelines about integrating tests of moderation and mediation. In particular, the tests below incorporate what Edwards and Lambert (2007, p. 8) call a "first stage moderation model." This means that in a mediated test with independent variable (X), mediator (M) and dependent variable (Y), depicted as this: X → M → Y it is the relationship between X and M that is moderated by Z.

The first path analysis contains all of the individuals in the face-to-face then virtual condition as well as the virtual then face-to-face condition. Results are shown in Figure 3. Sex was dummy coded as 0 = female and 1 = male. The manipulation was dummy coded as 0 = virtual then face-to-face condition and 1 = face-to-face then virtual condition. Results show that the model was a very good fit (χ^2 = 23.14, df = 18, CFI = .99, IFI = .99, RMSEA = .03, SRMR = .04).

The second path analysis contains all of the individuals in the face-to-face only and virtual only conditions. Results are shown in Figure 4. Sex was dummy coded as 0 = female and 1 = male. The manipulation was dummy coded as 0 = face-to-face only condition and 1 = virtual only condition. Results show that the model was a very good fit (χ^2 = 16.04, df = 18, CFI = 1.00, IFI = 1.00, RMSEA = .00, SRMR = .05).

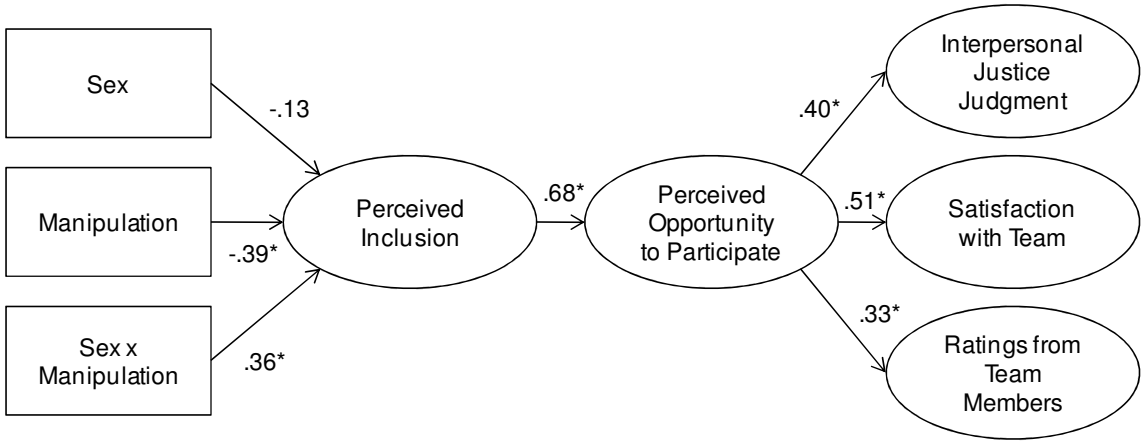


Figure 3. Path model with standardized path coefficients for the face-to-face then virtual and virtual then face-to-face conditions (includes self-reported participation).

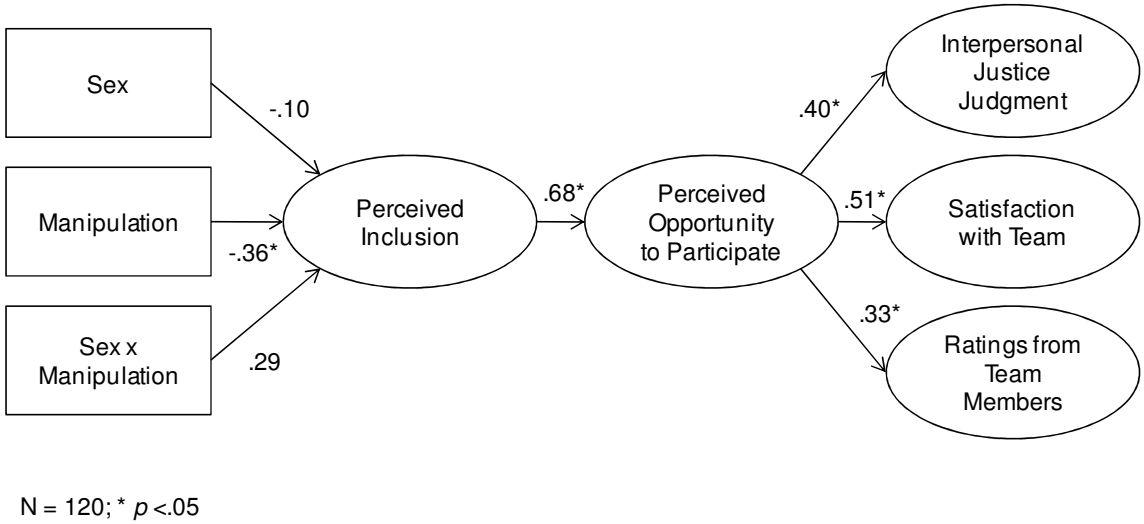
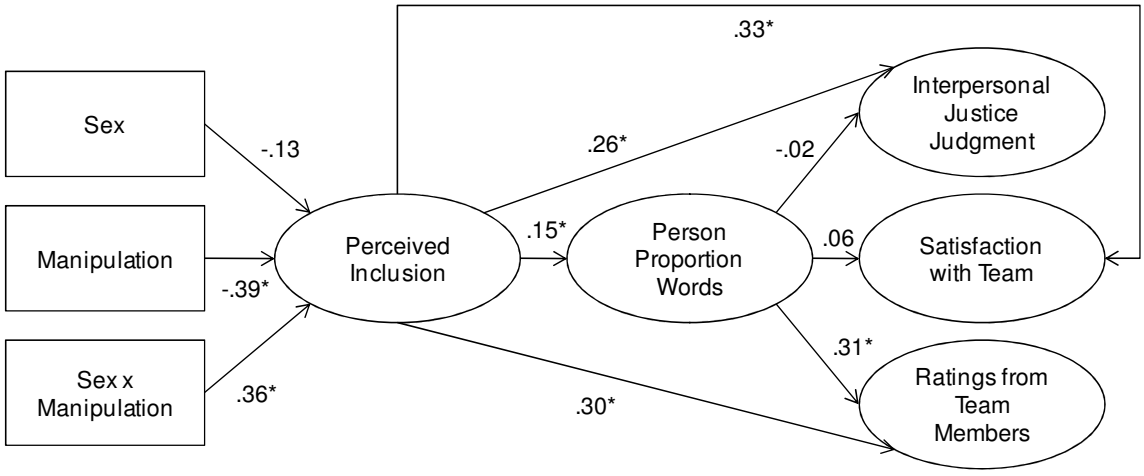


Figure 4. Path model with standardized path coefficients for face-to-face only and virtual only conditions (includes self-reported participation).

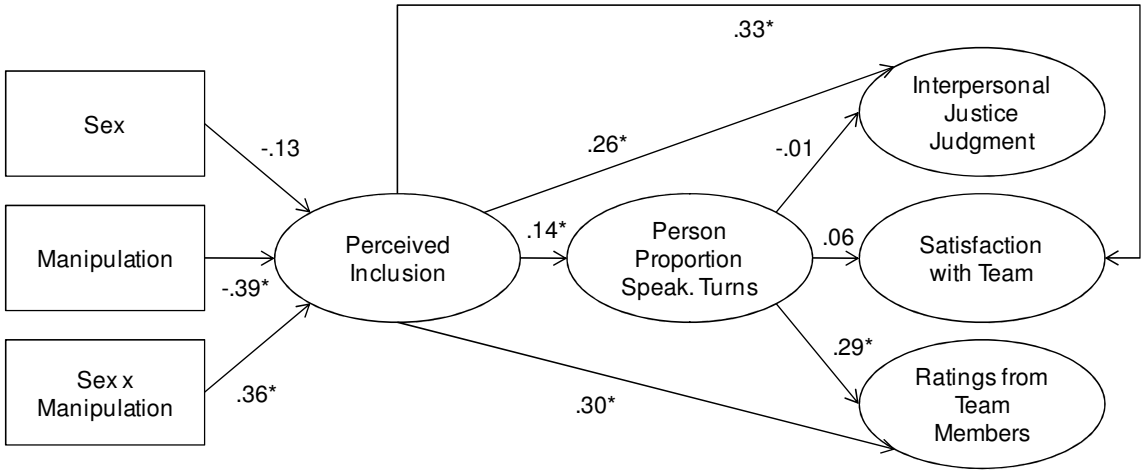
Next, I conducted some additional analyses to see if the model fit would hold when self-reported opportunity to participate was replaced by the objective measures: person proportion of speaking turns and words in the team discussion. Initial analyses across the face-to-face then virtual condition and the virtual then face-to-face condition showed that the path diagram as specified in the models above was a somewhat poor fit to the data both when using person proportion of speaking turns (χ^2 = 90.43, df = 18, CFI = .74, IFI = .75, RMSEA = .15, SRMR = .11) and person proportion of words (χ^2 = 89.46, df = 18, CFI = .75, IFI = .76, RMSEA = .15, SRMR = .11).

However, this is not surprising given that most of the variables in the model represent thought processes, and a psychological variable which is significantly correlated with the dependent variables (self-reported opportunity to participate) has been replaced with an objective measure of participation. It is much more likely that the effect of perceived inclusion on the dependent variables would only be partially transmitted through actual objective participation (as opposed to the fully mediated model reported in Hypotheses 6 through 9.) Therefore, an alternative model was assessed where direct paths between inclusion and each of the dependent variables were estimated. This time the model fit was good for both person proportion of speaking turns (χ^2 = 31.22, df = 15, CFI = .94, IFI = .94, RMSEA = .07, SRMR = .06) and person proportion of words (χ^2 = 30.43, df = 15, CFI = .95, IFI = .95, RMSEA = .07, SRMR = .06). Results are shown in Figures 5 and 6.



N = 206; * $p < .05$

Figure 5. Path model with standardized path coefficients comparing virtual then face-to-face and face-to-face then virtual conditions (includes objective participation in words).

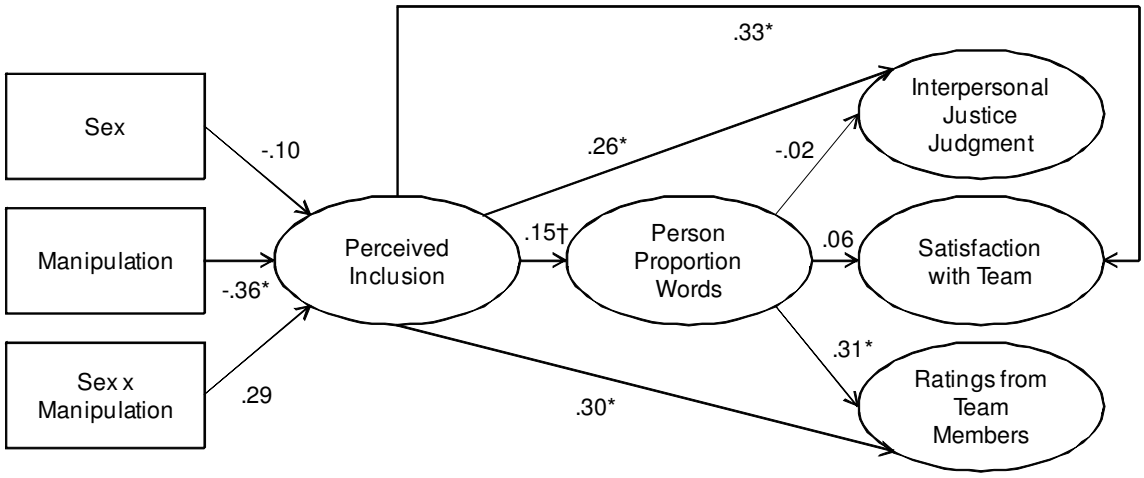


N = 206; * $p < .05$

Figure 6. Path model with standardized path coefficients comparing virtual then face-to-face and face-to-face then virtual conditions (includes objective participation in speaking turns).

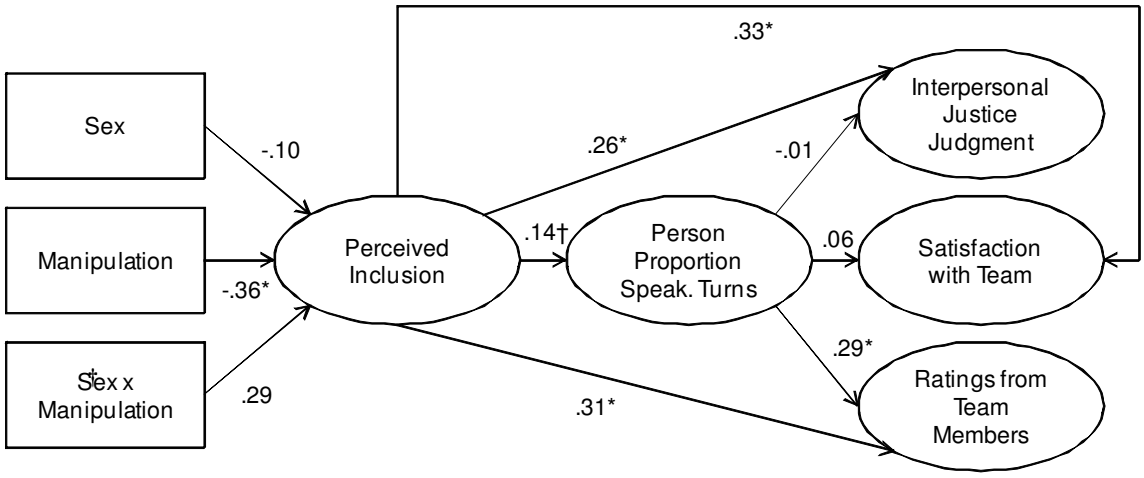
Analyses across the face-to-face only and virtual only conditions showed similar results. Initial analyses with just indirect effects of inclusion through objective participation showed a somewhat poor fit to the data both when using person proportion of speaking turns (χ^2 = 56.50, df = 18, CFI = .75, IFI = .76, RMSEA = .15, SRMR = .12) and person proportion of words (χ^2 = 53.96, df = 18, CFI = .77, IFI = .78, RMSEA = .14, SRMR = .12). However, when direct paths were estimated between inclusion and each of the dependent variables, the results showed good model fit for both person proportion of speaking turns (χ^2 = 22.13, df = 15, CFI = .95, IFI = .96, RMSEA = .06, SRMR = .06) and person proportion of words (χ^2 = 19.70, df = 15, CFI = .97, IFI = .97, RMSEA = .05, SRMR = .06). Results are shown in Figures 7 and 8. Although the magnitude of the path coefficients is similar in size to the path analyses comparing the face-to-face then virtual and virtual then face-to-face conditions, the sample size in this test was lower and some of the relationships did not reach significance using the conservative two-tailed test.

Finally, with regard to the dependent variable, team performance, the findings from this study suggest that an indirect effect of the medium of communication and inclusion to team performance can be inferred. From the path analyses above, we know that the medium of communication influences feelings of inclusion. Furthermore, as presented in Table 11, we know from the objective measure of participation that feelings of inclusion are correlated to both the actual person proportion of speaking turns (r = .30, p < .01) and the person proportion of words spoken (r = .28, p < .01) in the team.



N = 120; † $p < .10$; * $p < .05$

Figure 7. Path model with standardized path coefficients comparing face-to-face only and virtual only conditions (includes objective participation in words).



N = 120; † $p < .10$; * $p < .05$

Figure 8. Path model with standardized path coefficients comparing face-to-face only and virtual only conditions (includes objective participation in speaking turns).

Finally, some post hoc probing of the objective measures of participation on the team performance independent ratings revealed that the total volume of speaking turns in the team is positively related to the independent ratings of both team performance (r = .22, $p < .05$) and creativity (r = .25, $p < .05$). The same results were true for the total volume of words spoken in the team on team performance (r = .23, $p < .05$) and creativity (r = .29, $p < .05$).

This is consistent with the idea that information elaboration is an important part of team processes which then influences team performance (van Knippenberg , De Dreu & Homan, 2004). The findings of the present study suggest that when team members feel included in the team, they are more willing share information and ideas with team members, which then increases the pool of ideas that the team has to choose from, thus allowing the team to be more creative and perform better. This is also consistent with the informational perspective of team diversity which states that the richness of information derived from a diverse team should lead to enhanced quality of the team's work (Ancona & Caldwell, 1992; Jehn, Northcraft & Neale, 1999; Williams & O'Reilly, 1998; Zenger & Lawrence, 1989).

CHAPTER V

DISCUSSION AND CONCLUSION

In this chapter, I discuss how the study findings make a contribution to the virtual teams and team diversity literatures. I then discuss the limitations of the study and make recommendations for future research. Overall, the model posited in the study was well supported. There is evidence that women in male-dominated teams feel more included in teams that begin interacting virtually and then switch to face-to-face communication as opposed to teams that begin interacting face-to-face and switch virtual communication. This feeling of inclusion, the emergent state in the model, then leads people to participate in the team, which ultimately influences perceptions of interpersonal justice as well as satisfaction with the team and ratings from team members. The mediating logic presented in the model was supported because perceived opportunity to participate in the team fully mediated the relationship between inclusion and interpersonal justice as well as the relationship between inclusion and satisfaction with the team. Furthermore, the objective measure of participation was positively and significantly correlated with the self-reported measure of participation which provides more support for the model.

Theoretical Implications

The findings in this study provide mixed support for both social presence theory (Keil & Johnson, 2002; Short, Williams & Christie, 1976) and media richness theory (Daft & Lengel, 1984). The finding that women who meet in team settings that communicate virtually first and then face-to-face is consistent with social presence theory, because this theory would predict that establishing team norms using virtual communication would lead the minority team members to feel less socially present than if they were face-to-face. As such, the women in the minority situation on the team should feel more included because their presence is less salient while the norms are being established. The women in the condition that met face-to-face first, on the other hand, would be more salient during the time team norms were set and would therefore feel more like a minority and less included in the team. Therefore, the findings in these two experimental conditions are consistent with social presence theory (Bordia, 1997).

However, the finding that women in the face-to-face only condition reported higher levels of inclusion than the women in the virtual only condition is contrary to social presence theory. Although social presence theory would predict that women who are minority members in teams may feel less included when they are the most socially present (i.e., in the face-to-face condition), the findings in this study show the opposite. Women in the face-to-face condition reported the highest levels of inclusion. This is contrary to what social presence theory would predict in this situation.

Interestingly, the study findings for the conditions that communicated either face-to-face only or virtually only also show mixed support for media richness theory (Daft & Lengel, 1984). This theory maintains that shared meaning can be more easily established in a team when the communication medium is richer, because it contains more verbal and non-verbal cues. Therefore, people have been shown to have more positive affect as the perceived richness of the media increases (Treviño, Webster & Stein, 2000). However, this theory would also predict that face-to-face communication would be the richest and therefore potentially the least inclusive of women who are minority members on teams. The findings from this study show mixed support for this theory. The fact that women in the face-to-face then virtual condition felt less included than the women in the virtual then face-to-face condition supports the notion that initial social categorization can make minority status more salient. This is consistent with the prediction that making people less socially present as norms are set will help the minority feel more included. However, the finding that women in the face-to-face only condition reported higher inclusion than women in the virtual only condition seems more consistent with the notion that people may simply have more positive affect to richer communication media.

Taken together, these findings suggest that the inclusion of women in male-dominated teams is influenced by both the communication *medium* and the *order* of communication. While women feel more included when they have only the richness of face-to-face communication as opposed to only virtual communication, in situations where they switch medium of communication, they also feel more included when the

team sets norms virtually as opposed to face-to-face. This suggests that both social presence theory and media richness theory need to be modified to take into account the order of virtual and face-to-face communication in virtual teams. When the medium of communication is either virtual or face-to-face only, the women in male-dominated teams appear to enjoy the richness of the face-to-face medium, which is consistent with previous findings (Treviño, Webster & Stein, 2000). However, when the medium of communication changes between face-to-face and virtual, having the less socially present virtual communication first seems to help women feel more included.

The finding that women who are in the minority feel more included in teams that began interacting virtually also has important implications for the team diversity literature. Researchers who study team diversity have typically concluded that diversity in teams leads to negative effects and poor interaction between team members because of problems associated with social categorization and similarity attraction. The robustness of the social categorization phenomena is typically without question. In fact, social categorization is used very commonly to explain why diverse teams have problems and suffer process losses (Mannix & Neale, 2005). However, social categorization theory is predicated on the notion that team members will interact, to a large extent at least, face-to-face. The originators of the theory could not possibly have foreseen the dramatic advance made in information and communication technologies allowing many teams to work primarily using virtual means. The present study demonstrates that the social categorization phenomenon may not always hold, given the right context. In particular, when the initial norms of interaction in the team are

established in a setting that makes social categorization less salient, it appears that social categorization becomes less important and individuals who are clearly in the minority within the team feel more included.

It is important to note that, given the design of the experimental lab in this study, the results reported here may be conservative. In fact, participants of the study all came into the room together and were in the same room during the duration of the study, thus making it obvious that there were three men and one woman in the team. Furthermore, during the chat session participants were identified by name. This design was carried out purposely in order to make the study more generalizable to a real world setting, in which team members will likely know each others' names and have some information about each other. In other words, this study by no means achieved the complete absence of social categorization. Instead, the study simply created a situation where the team members were less socially present than in face-to-face communication. This was accomplished by the use of the computers and the cubicle wall dividers between people during the virtual interaction section of the team task. Therefore, this is a conservative test of the phenomenon. The finding that the order of communication makes a difference in how included people feel in teams has major theoretical implications for diversity research which assumes that social categorization is a given and that "like it or not, to be human is to discriminate in some form or fashion" (Dipboye & Colella, 2005, p. 456). Although this may be true in most social settings (i.e., those where social categorization is salient), the study demonstrates that, under the right conditions, it is

possible to weaken the effects of social categorization and therefore remove some of the problems associated with diversity and teams.

Interestingly, although I found that the order of communication made a difference for teams that switched communication medium, I did not find that women felt more included in the virtual only condition as compared to the face-to-face only condition. In fact, conversely, the women in the face-to-face only condition reported higher feelings of inclusion than women in the virtual only condition. I have three possible explanations for this. First, one possibility is that given the demographics of the sample, the women enjoy being with three men. According to Kanter's theory and to her observations of men and women in a corporation, there are two possible reactions that the majority can have to someone who is a token or a minority. Both reactions are due to the tremendous salience of that individual. On the one hand, the individual may be marginalized. On the other hand, the individual may play special role in the group as a mascot, or a representative for the particular group that they are a member of. It is possible that the setup of the present study led to a situation where the minority was special.

In a study similar to this one, Bhappu, Griffith, and Northcraft (1997) conducted a study with 6-person teams (3 men, 3 women) of college students and included virtual only and face-to-face only conditions. They found that only in the face-to-face condition, where social categorization was most salient, the men and the women both paid more attention to the males in the team. This is not surprising, as it is well established in research on group behavior that in teams with mixed-status individuals,

the higher status individuals speak more often and have more control and influence over the group processes and discussions (Berger, Cohen & Zelditch, 1972; Cleveland et al., 2000; Holtgraves, 1986). It is important to note, though, that the teams in Bhappu, Griffith, and Northcraft's (1997) study were balanced teams (Kanter, 1977) with equal numbers of men and women. In the present study, the woman was much more salient because the ratio of men to women was 3:1. Perhaps Kanter (1977) stated it best in her description of minorities. She presented the following sequence: xxxxxxoxxx and said that "If one sees nine X's and one O, the O will stand out. The O may also be overlooked, but if it is seen at all, it will get more notice than any X" (Kanter, 1977, p. 210). In Bhappu, Griffith, and Northcraft's study (1997), the people would be in the following sequence: xxxooo representing 3 men and 3 women. The teams were balanced by sex, thus no one person stood out because of sex. However, in the present study the people would be in the following sequence: xxxo thus creating a situation where the woman got a great deal of attention in the face-to-face setting where sex was made most salient.

A second explanation for these findings is that the women simply enjoyed the human contact of the face-to-face settings. Because of the way that women are socialized when they are young, whereby they are taught to value interpersonal relationships and care for others (Heilman, 1995; Kimmell, 2001; Wood, 1994), it is possible that women simply enjoyed the interpersonal contact of the face-to-face setting more so than the virtual setting. This is consistent with previous meta-analytic findings in the CMC literature which show that people in general (without taking sex into

account) tend to be more satisfied with face-to-face communication than virtual communication. Specifically, the meta-analysis by Baltes, Dickson, Sherman, Bauer, and LaGanke (2001) reported that people (in general) were less satisfied with the team when they communicated virtually (d = -.52).

Finally, a third explanation for the fact that women enjoyed face-to-face communication more than the virtual communication is that the experimental setup of the lab may have created a frustration effect for the people in the virtual setting. Because the four members were all in the room together and could see each other, it is possible that the lower inclusion ratings given by team members of the virtual setting are capturing negative reactions to the physical layout of the room. In fact, upon inspection of the chat logs from these teams, I noticed that occasionally someone made the comment at the end of the session along the lines of "now imagine how much we could have accomplished if we had been allowed to talk." It is well established in the virtual teams literature that virtual communication does increase the length of time that it takes to complete a task (Martins, Gilson & Maynard, 2004). As such, it is possible that team members in this particular condition became frustrated. In a field setting where members of the team are distributed around different geographies, the team members are likely to understand that they need to communicate virtually because they have no other choice. In such instances, there may be less negative affect associated with virtual only communication. However, in the present study, participants saw each other and were physically in the same room during the study. Because of this, they may not have seen a reason for the virtual communication and thus reacted negatively to that setting.

Consistent with previous research, I was able to replicate the equalization phenomenon of Siegel et al. (1986) because team members in the virtual condition participated more equally than team members in the face-to-face only condition. However, contrary to expectations, there were no differences in the amount of participation for women in the virtual then face-to-face condition compared to the face-to-face then virtual condition. Women in the virtual then face-to-face condition spoke about the same amount as a proportion of words and speaking turns compared to women in the face-to-face then virtual condition. Therefore, virtual communication seems to produce similar results in terms of objective amounts of participation regardless of what order it is done in. Virtual communication is well known to equalize the participation among participants. It appears that having the team interact virtually during half of the time they are together is enough to equalize the communication, regardless of the order of communication.

Also contrary to the hypotheses, I found no support for the hypothesis that women in the virtual condition would receive higher team member ratings than women in the face-to-face only condition. In fact, the women in the face-to-face only condition received slightly higher ratings from their team members (although not significantly so) than the women in the virtual only condition. I believe the reason for this is consistent with the reason why women in the face to face condition reported higher inclusion than women in the virtual condition. As explained above, it seems that the solo woman was treated as if she was special and actually received more speaking time than she should have been due as a proportion of the total team conversation. In fact, the mean person

proportion of speaking turns for women in the face-to-face condition was *M* = .30, *SD* = .10 and the mean person proportion of words was *M* = .30, *SD* = .16. If the conversation had been even, each team member should have received .25 of the speaking turns and words in the session. Therefore, the women in the face-to-face only session actually got to participate more than their proportional fair share. Conversely, women in the virtual only session spoke slightly under what they would have been due as a proportion of the total team. The mean person proportion of speaking turns for women in the virtual only condition was *M* = .20, *SD* = .09 and the mean person proportion of words was *M* = .20, *SD* = .08. It appears that the women in the virtual only condition were slightly more likely to be marginalized as the tokens on the team. Table 11 shows that ratings from peers are strongly and positively correlated to both the person proportion of speaking turns and the person proportion of words. This would explain why the women received higher ratings in the face-to-face only session.

Finally, the hypothesis predicting that the more evenly team members participated, the better the team performance would be was partially supported. Teams where the four members participated evenly in the discussion, as measured by speaking turns, were rated by the five independent raters to have better performance and more creative solutions to the problem. However, while similar patterns emerged with the number of words across team members, this variable was not significantly correlated with either performance or creativity. It appears that having the opportunity for team members to speak is more important than the length of what is actually said. This suggests that just having equal opportunity to present ideas across team members,

regardless of how long or short the statement, is what influences team performance and team creativity. This is also consistent with the theoretical model presented by van Knippenberg, De Dreu, and Homan (2004) which stated that team diversity would result in term performance when an information elaboration process took place such that the information of the diverse team members could come to the surface of the team discussion.

Managerial Implications

The finding that women in the virtual then face-to-face condition felt more included in the team than the women in the face-to-face then virtual condition has practical implications for virtual teams, because it suggests that the order of communication matters. Published research and anecdotal evidence from managers seems to uniformly suggest that teams should always have initial meetings face-to-face first (Hambley, O'Neill & Kline, 2007a; Horwitz, Bravington & Silvis, 2006; Lantz, 2001; Malhotra & Majchrzak, 2005). The findings in the present study suggest that this may not always be desirable. In fact, the results of this study suggest that when the team is diverse and social categorization on surface level characteristics could lead some members of the group to be excluded, initial face-to-face meetings may not be as appropriate as virtual ones. Instead, the findings suggest that such teams may benefit from establishing norms in virtual communication mode before switching to face-to-face communication. The finding that women feel more included in teams that interact virtually and then face-to-face suggests that women who are in the minority will feel

more included and, therefore, contribute more to the team discussion when team norms are set virtually.

Furthermore, what is just as important to know from a practical perspective is that this change in communication medium made absolutely no difference for the men in terms of how included they felt. In fact, in some exploratory post-hoc analyses to determine the effect of communication order on men, the data show that reported mean inclusion was almost identical for the men in the virtual then face-to-face condition compared to the men in the face-to-face then virtual condition. An ANCOVA on feelings of inclusion with race, age, core self evaluations, extraversion, openness, marketing knowledge, and the Bem Sex Role Inventory as covariates produced no statistically significant results $F_{(1,146)} = .78$, $p > .05$, partial $\acute{\eta}^2 = .01$. The means were almost identical, with men in the virtual then face-to-face condition reporting mean inclusion of $M = 5.86$, $SD = .98$ and men in the face-to-face then virtual condition reporting mean inclusion of $M = 5.76$, $SD = 1.11$.

This finding has important practical implications for virtual teams because it suggests that it is possible to use the order of communication to establish norms of participation in a setting that reduces social categorization, which helps the minority team member feel included without having any detrimental effects on the majority team members. This challenges conventional wisdom in the virtual teams literature, which suggests that teams should always meet face-to-face first (Hambley, O'Neill & Kline, 2007a; Horwitz, Bravington & Silvis, 2006; Lantz, 2001; Malhotra & Majchrzak, 2005). In team settings where member characteristics could be conducive to forming majority

and minority/in-group and out-group team members, the present study suggests that the opposite approach may be beneficial.

In a business setting, most virtual teams have degrees of virtualness, meaning that they switch back and forth between virtual and face-to-face communication (Griffith & Neale, 2001; Kirkman & Mathieu, 2005). The present study suggests that this actually provides an opportunity for diverse team members to establish norms of equality in a less socially present team setting before meeting face-to-face. Therefore, managers may wish to consider the demographics of their teams when determining how to set the initial norms of communication. If the team is homogenous and could benefit from the similarity-attraction phenomenon (Byrne, 1971), an initial face-to-face meeting may be the best option. If the team is heterogeneous such that certain people are salient minorities who could feel left out, an initial virtual meeting might be the way to go. This is especially relevant since findings in the virtual teams literature have been mixed about whether teams perform better via face-to-face communication or virtual communication (Martins, Gilson & Maynard, 2004). While there is evidence that virtual communication increases the amount of time it takes to complete a task, virtual communication also tends to be much more focused on the task as compared to face-to-face communication, where the team often gets off-topic (Martins, Gilson & Maynard, 2004).

In addition, one of the main advantages that is often touted as a reason for having virtual teams have initial face-to-face meetings is that it will help create a bond between team members, the so called “warm and fuzzy” feeling that you might get from establishing rapport with people (Hambley, O’Neill & Kline, 2007a; Horwitz,

Bravington & Silvis, 2006; Lantz, 2001). However, in the present study, there is no evidence that participants were more satisfied with the teams that began using face-to-face communication. In some post hoc analyses, I found that women were equally satisfied whether their teams engaged in virtual then face-to-face communication (M = 5.99, SD = .97) or face-to-face then virtual (M = 5.76, SD = .83), t(48) = .89, $p > .05$. Men were also equally satisfied with the team in the virtual then face-to-face communication (M = 5.82, SD = 1.05) or face-to-face then virtual (M = 5.85, SD = 1.04), t(154) = -.23, $p > .05$. When teams are switching between communication mediums, the order of communication does not seem to affect their satisfaction with the team. It also does not affect the levels of inclusion for men (the majority members) in the team. What it does affect is the way that women (the minority members) feel included in the team.

Therefore, the take-away message from these findings for managers is that when they have people in the team who could be left out because of minority status on some salient surface-level characteristic, it may make the most sense to let the team begin interacting virtually. The results from this study imply that this would allow the minority team member to feel more included and participate more in the team. Results indicate that this benefit could be gained without causing any harmful effects to the team in terms of the level of team member satisfaction or the level of inclusion for the majority members.

Limitations and Future Research

One limitation of the study is the nature of the sample itself. As discussed earlier, there may be certain characteristics of 21-year-old college students that do not generalize well to the rest of the population. Although these individuals are young adults, they are at the time in their lives where the "dating scene" is quite salient and interpersonal attraction for the opposite sex may strongly influence the way that they behave. This particular university is also known for conservative values, and occasionally people joke that the female students may be here to get a "MRS" degree, as in "Mrs." like a wife. This could explain why the women were so positive and their team member ratings were also so high in the face-to-face only condition. Of the four conditions of the study, this would be the one that is most susceptible to the influence of interpersonal attraction for people of this age group, because social categorization was very salient during the entire study. This presents a generalizability limitation for the study, because of that unique characteristic of the sample.

In particular, this represents a limitation when trying to generalize to certain business settings where women would be in the minority. For example, although the current sample may generalize to young women who have recently entered the workforce in male-dominated fields (engineering perhaps), it would be more difficult to make the claim that the current sample would generalize to more experienced women in much higher level positions in male-dominated teams (such as top management teams).

Therefore, due to the nature of the sample the results best generalize to business settings with young adults working in male-dominated teams.

One way to remedy this limitation would be to try and replicate these results with different samples. Ideally, this study could be replicated in a real-world setting to improve its generalizability. One possibility would be to see if the findings replicate with older individuals. People who are married or have more work experience may have responded differently to being in the minority. Another question is whether the findings in this study may generalize to other types of minorities. For example, would the results observed with sex in this particular study generalize to other forms of diversity such as race or age? It seems reasonable to assume that the results of the study may also generalize to other salient surface-level characteristics which could lead to social categorization of minority team members. However, this would have to be empirically tested, because it is possible that age and race may sometimes be more difficult for others to ascertain than sex.

Another limitation of the study is regarding the experimental design of the study itself. Because of the nature of the experimental design, there is a trade-off and internal validity is improved at the expense of external validity. In particular, dynamics in a field setting with intact teams that have worked together for some time might be different. The people in this particular study were in the room together for two hours and then disbanded, which also limits the generalizability of the study. Ideally, this study could be replicated in a field setting with true work teams. However, given all the requirements of this research question (a token female in a male-dominated team, a

decision-making task with high-interdependence, the formation of norms early in the team life cycle, the correct order and quantity of virtual and face-to-face communication, and a large enough sample size to find a medium effect size), I suspect this study would be nearly impossible to conduct in a field setting with intact teams. An advantage of this study is that these conditions could actually be created in a laboratory setting. The creation of such a unique setting allows us to see what could really happen out in the field if the right conditions could be created.

A final limitation of the study is the cross-sectional nature of the data collection. Although there was a temporal gap between the control variables (Phase 1) and the variables collected during the lab study (Phase 2), a number of variables were collected at the same time during the laboratory experiment. This presents difficulty in establishing the order of causality for the mediating chain in the model because there is no temporal gap between the variables to establish a temporal precedence (Shadish, Cook & Campbell, 2002). One way to avoid this problem might have been to stop the team at the 25 minute point in the case activity to ask participants the inclusion questions. The rest of the variables would then have been collected at the end of the session, putting a temporal gap between inclusion and participation. However, during the design of the study I decided not to do this for three different reasons. First, stopping participants at the midpoint and asking them to answer questions could have caused problems if it created a demand characteristic by showing participants what I was looking for in the study. This could also have produced a priming effect, therefore changing the participant's behavior during the second half the study. Creating such an

effect during the study could damage the study by making participant responses unnatural.

The second reason I opted not to put a temporal gap in the way the variables were collected during the lab study is due to the nature of the emergent state itself. By definition, emergent states are temporary and can change. As such, it is possible that during the course of the team exercise, the emergent state (inclusion) influenced the mediator (opportunity to participate) which then influenced the next emergent state (inclusion) and so on. If inclusion had been measured at the 25-minute point, that would allow for a temporal gap between x → y. However, what instance of that x → y relationship might I have captured? In other words, while having that temporal gap would have made it easier to establish causality, there is no guarantee that the particular x → y relationship captured was not preceded by a different instance of y which was also preceded by a different instance of x. As such, even if the variable had been measured at some point during the study, we would still not know with certainty which iteration of the emergent state-process-outcome loop had been captured.

The third reason I decided not to stop the team during the activity to ask them questions was for fear of creating an ecological fallacy. In other words, stopping and restarting the team during an intense decision-making exercise might have been so unnatural and contrived that it would create a situation that does not generalize to any other reasonable real-world setting.

As a result of these three concerns, I opted to simply ask all of the questions at the end of the team case activity. I believe this allowed me to capture participants'

natural reactions to the team exercise without creating a demand characteristic, a priming effect, or an ecological fallacy. Still, I acknowledge that the cross-sectional nature of the study is a limitation. Ideally, future research could investigate the inclusion and participation of men and women team members in a field setting without the confines of an experimental design. A longitudinal study following virtual teams from the time they form well into the performance stage of the team process would be ideal, as it would allow researchers to measure how team members feel included and participate as norms are established and as the medium of communication switches back and forth during the team life cycle.

Another limitation of this study is that the scope of the study was limited to one way of establishing equal norms of participation, namely, by experimenting with the order of face-to-face and virtual communication. A direction for future research is to examine other ways of creating equal norms of participation. For example, this study only investigated one of several ways that Feldman (1984) proposed norms develop in a team setting (i.e., the first pattern of communication). Feldman also said that norms may develop if the leader imposes a rule for the team or if the team acknowledges a problem and consciously decides to change its pattern of communication. These different patterns of developing norms may be fruitful for future research. In an experimental design, it would be very simple to simulate the leader imposed rule by having the facilitator make a statement to the effect that all members are expected and encouraged to contribute equally. In other settings, it may be possible to identify teams that did not set good norms of equal participation initially, and ask the team to make a conscious

decision to change that moving forward. A before/after comparison of the intervention could then be made. These are some of the ways that future research could investigate other means of setting norms of equal participation in teams.

A final limitation of this study is that because the task used in the study was gender neutral, these results can best be generalized to settings where teams are working on gender neutral tasks. This was done purposely, to try and isolate the effects of the communication medium and order of communication without task effects. In reality, most settings where one would find male-dominated teams are probably working in more male-dominated areas and tasks. In that sense, the present study could be considered a conservative test, because the effects of sex roles and social categorization may be even more pronounced in male-dominated settings where the task is also masculine. Future research may endeavor to test the current research questions in a setting where more masculine tasks are being performed in order to test the extent to which the findings will generalize.

Conclusions

The results of the study are consistent with the goals laid out for the four contributions of the study presented in Chapter I of this dissertation. The first goal of the study was to make a contribution to the virtual teams literature by identifying potential benefits to having diverse teams interact virtually before they interact face-to-face. Although this is contrary to the conventional wisdom in virtual teams research and practice, the results of this study demonstrate that there may be some advantage to this

because it makes women feel more included, even when they are clearly a token in a male-dominated team.

The second goal of the study was to explore a possible path to promote equal participation among men and women in diverse teams. Along these lines, I was able to replicate the equalization phenomenon found by Dubrovsky, Kiesler, and Sethna (1991) and Siegel et al. (1986). Virtual teams do, in fact, participate more equally than face-to-face teams. One surprising result was that the unequal participation in the face-to-face team setting often meant that the woman in the team was getting a disproportional amount of attention. However, this is consistent with Kanter's observation of what happens when the token/minority individual is seen as playing a special role in the team. It is also understandable that this might happen given the particular limitations based on this sample of young adults.

The third goal of the study was to inform research regarding team processes. The study demonstrates that it could be possible for equal norms of participation that get established during virtual communication to carry forward into face-to-face communication. Women in the virtual then face-to-face condition did feel more included in the team than women in the face-to-face then virtual condition. Furthermore, this study provides more support for the process models of teams which advocate that emergent states exist. In this particular study, the emergent state (inclusion) influenced the process (opportunity to participate), which then influenced the outcome variables (interpersonal justice and satisfaction with the team).

Finally, the fourth goal of the study was to make a contribution to the literature on social categorization, similarity attraction, and team diversity. While most of this literature treats social categorization as an ever-present force that causes problems in diverse teams, this study shows that if you can establish norms in a context where social categorization is weakened, it is possible to remove some of the negative outcomes of social categorization that are well-documented in the team diversity literature.

Overall, the evidence from this study suggests that the virtual teams setting provides a new context for diverse team members to interact in a setting where social categorization is reduced. Hackman (1987, p. 319) said the teams could combat process losses and achieve process gains if they could only identify ways of working together that "*differ* from typical interaction" and "test novel patterns of team interaction." In the case of diverse teams that typically suffer from process losses due to social categorization (Williams & O'Reilly, 1998), modern-day technology and the use of virtual teams may have given us just that.

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APPENDIX A

ESTIMATE OF TEAMS PER CLASS

Low Estimate

MGMT 363 has 520 students
Historically, about 75 percent will participate = 390 students will participate
50 percent of these are female and 50 percent are male = 195 males, 195 females will participate

<u>If teams have 3 males and 1 female</u>
To get teams of 3 males and 1 female we need to overbook people to guarantee a group

Booking 6 males and 6 females per session should guarantee 3 males will come

195 total males/6 males per session = 33 teams per class

High Estimate

MGMT 363 has 520 students
Last semester I used this class for a study and 90 percent participated = 468 students
50 percent of these are female and 50 percent are male = 234 males, 234 females will participate

<u>If teams have 3 males and 1 female</u>
To get teams of 3 males and 1 female we need to overbook people to guarantee a group

Booking 6 males and 6 females per session should guarantee 3 males will come

234 total males/6 males per session = 39 teams per class

APPENDIX B

QUALITATIVE COMMENTS FROM PRETEST 1

Comments made by males	Comments made by females
angry	accepted
anxious	agreeable
anxious	annoyed
appreciated	annoyed
appreciated	anxious
apprehensive	anxious
approved	comfortable
assertive	comfortable
at ease	comfortable
blessed	comfortable
busy	confident
busy	confident
clear	confident
closed minded	confident
cohesive	confident
comfortable	confident
comfortable	curious
comfortable	defensive
comfortable	defensive
comfortable	dependent
comfortable	domineering
comfortable	doubtful
comfortable	egocentric
competitive	empowered
competitive	equal
competitive	excited
confident	friendly
confident	frustrated
confident	ignored
confident	included
confident	inferior
confident	inferior
confident	inferior
confident	intimidated

confident
confident
confident
confident in my beliefs
confused
content
defensive
determined
disappointed
energized
enthusiastic
equal
equal
friendly
frustrated
funny
happy
heard
heated discussion
highly favored
included
included
included
influencing
inspired
intelligent
interactive
involved
involved
involved
involved
judged
knowledgeable
left out
less important
intimidated
intimidated
intimidated
intimidated
looked down on
misunderstood
nervous
nervous
nervous
nervous
nervous
nervous
nervous
nervous
not confident
not supported
out of place
out of place
out of the loop
outnumbered
outnumbered
outnumbered
overpowered
overpowered
overruled
overwhelmed
overwhelmed
passive-aggressive
pressured
pretty
quiet
quiet
related
relaxed
respected

noisy	respected
one opinion that everybody was agreement on .not me	respected
open to new ideas	respected
opinionated	respected
opinionated	secure
overpowered	self conscious
productive	shy
relaxed	shy
relaxed	shy
relaxed	smart
relaxed	uncomfortable
reliable	uncomfortable
reserved	uncomfortable
satisfied	uncomfortable
significant	undermined
skeptical	understood
social	undervalued
sometimes defensive	uneasy
strong	unsure
strong	valuable
stuffy	vulnerable
supported	weaker
task-oriented	
timid	
understanding	
unproductive	
welcomed	
willing	
your opinion didn’t count	

VITA

MARY CARMEN TRIANA

María del Carmen Triana earned a Bachelor of Business Administration degree in Management and the Business Honors Program at The University of Texas at Austin. She then earned a Master of Business Administration degree in Information Systems and Marketing from The University of Arizona. Ms. Triana has professional work experience as a systems analyst and project manager at both Raytheon Systems and Intel Corporation. She is a member of the Academy of Management, the Society for Industrial and Organizational Psychology, and the Society for Human Resource Management. She is also a member of the Project Management Institute (PMI) and holds a certification as a Project Management Professional through PMI.

Ms. Triana's research interests include diversity, organizational justice, and strategic human resources management. Her teaching interests include organizational behavior, human resources, and team dynamics. Her research has been published in the *Journal of Applied Psychology*, *Basic and Applied Social Psychology*, the *Encyclopedia of HRIS: Challenges in e-HRM*, and *Research Methodology in Strategy and Management*.

Ms. Triana will begin her academic career as an Assistant Professor at the University of Wisconsin at Madison. She may be reached at the UW-Madison School of Business, Department of Management and Human Resources, 975 University Avenue, Madison, WI 53706. Her email is mtriana@bus.wisc.edu.